

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GOOGLE LLC,

Petitioner,

v.

HEADWATER RESEARCH LLC,

Patent Owner.

Patent No. 8,631,102  
Case No. IPR2026-00050

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**PETITION FOR *INTER PARTES* REVIEW**

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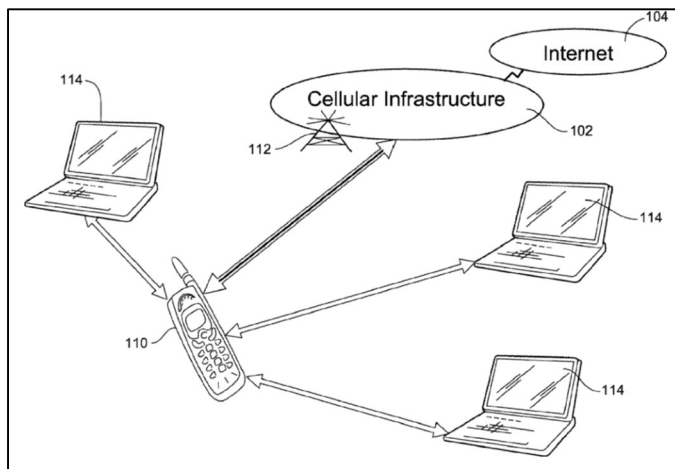
| <b><u>Exhibit</u></b> | <b><u>Description</u></b>                                                                  |
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| EX1001                | U.S. Patent No. 8,631,102 to Raleigh (“the ’102 patent”).                                  |
| EX1002                | Prosecution History of U.S. Patent No. 8,631,102.                                          |
| 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> ”).             |
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| EX1008                | U.S. Patent No. 9,691,082 to Burnett et al. (“ <i>Burnett</i> ”).                          |
| EX1009                | U.S. Patent Appl. Publ. No. 2004/0103193 to Pandya et al. (“ <i>Pandya</i> ”).             |
| EX1010                | U.S. Patent Appl. Publ. No. 2008/0313327 to Sewall et al. (“ <i>Sewall</i> ’327”).         |
| EX1011                | U.S. Patent Appl. Publ. No. 2005/0197098 to Trossen (“ <i>Trossen</i> ”).                  |
| 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> ”).                    |

## I. Introduction

Petitioner Google LLC respectfully requests *inter partes* review of claims 1-30 of U.S. Patent No. 8,631,102.

The '102 patent claims an end-user 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 also stores policy settings to authorize provision of the forwarding service and to enable or disable the forwarding service, as was known in the art by January 28, 2009 (i.e., the earliest possible priority date).

The prior art confirms that the claimed end-user device providing a forwarding service was not merely known—by that time, such mobile-hotspot technology was already old and “conventional.” EX1005, ¶28; EX1012; EX1013; EX1014; EX1015.



EX1005, Fig. 6.

Indeed, *Thomas* (EX1005) anticipates the sole independent claim of the '102 patent, disclosing every limitation. *Thomas* and *Sewall*, which also discloses a cellular device operating as a “personal hotspot,” also compel a conclusion that claim 1 was obvious as of January 2009. The dependent claims recite various other conventional hotspot features (e.g., limiting the number of devices accessing the forwarding service) that a person of skill would have known and found anticipated and/or obvious based on *Thomas*, *Sewall*, and other references like *Boudreau*, *Burnett*, *Pandya*, *Sewall* '327, or *Trossen*.

As demonstrated in the grounds below, there is a reasonable likelihood that at least one claim—and indeed all claims—of the '102 patent are unpatentable. Petitioner therefore respectfully requests that the Board institute *inter partes* review and cancel all claims of the '102 patent. Such action by the Board is warranted in view of the Office's errors during a brief and cursory examination, where the Examiner failed to issue *any* prior-art-based rejections despite Patent Owner's late filing for the '102 patent in a clearly crowded field of personal-hotspot prior art.

## II. Technology Background

### 1. Overview of *Thomas*

*Thomas* discloses a wireless device capable of providing access to the internet or other WAN for one or more other computing devices via wireless local-area networks. EX1005, Abstract, ¶25; EX1003, ¶44. *Thomas*'s wireless device provides a dynamic, secure, and flexible networking environment by allowing real-time configuration of network connections. EX1005, ¶29.

*Thomas*'s wireless device includes a DSP, a memory including a client-access application, a display, and a processor:

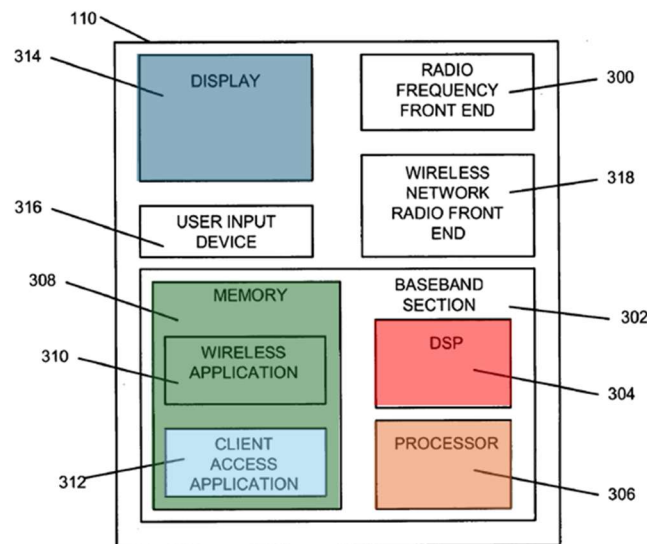
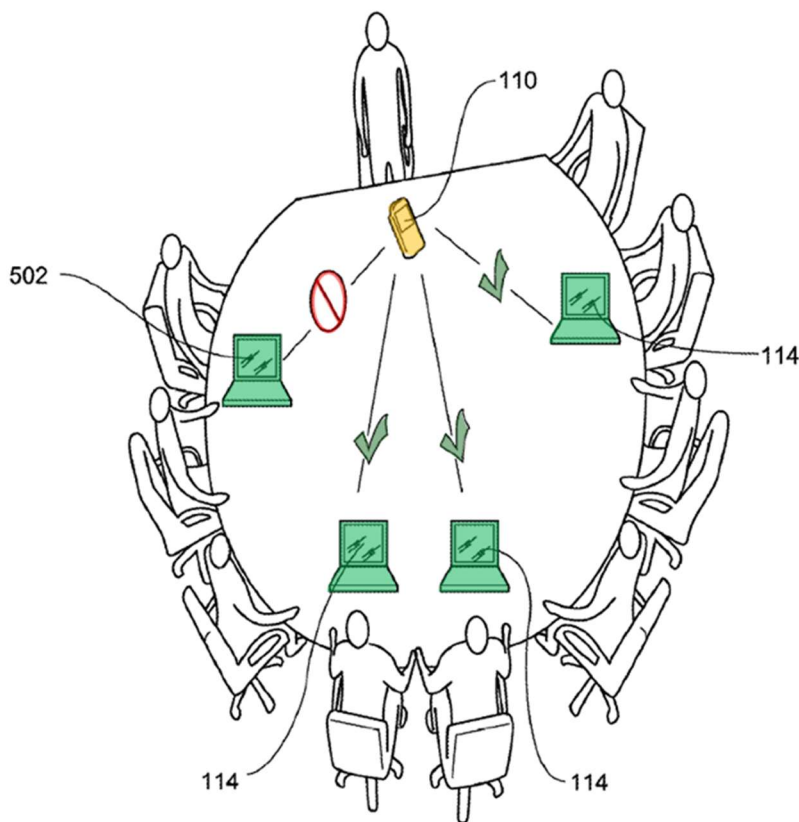


FIGURE 3

EX1005, ¶¶33-34, Fig. 3 (annotated); EX1003, ¶45. The client-access application provides “application-level point of presence capabilities” to the wireless device. EX1005, ¶34.

As shown in Fig. 5, reproduced below, the wireless device 110 of *Thomas* may authorize networking traffic by allowing a user, through a user interface, to accept or deny requests from client devices 114 to access the internet.

**FIGURE 5**



EX1005, Fig. 5 (annotated), ¶44; EX1003, ¶46.

## **2. 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, ¶47.

### **3. Overview of *Boudreau***

*Boudreau* discloses a mobile wireless server that includes parameters that may be set to configure a mobile wireless client. EX1007, Abstract. The wireless server of *Boudreau* communicates with the mobile wireless clients over a secure wireless channel. EX1007, ¶49. The wireless server may establish a “trust group” among mobile wireless clients to ensure secured communications. EX1007, ¶52; EX1003, ¶48.

### **4. Overview of *Burnett***

*Burnett* discloses a wireless communications network including a wireless data device and mobile communications devices in communication with a radio access network. EX1008, 3:54-62. *Burnett* further provides a “dynamic subscription update feature” that may include an update offer that can be sent as a formatted message to a subscriber’s device. EX1008, Abstract, 7:54-67; EX1003, ¶49.

### **5. Overview of *Pandya***

*Pandya* discloses a distributed network that includes servers and client devices connected over a network link. EX1009, ¶32. *Pandya*’s distributed

network includes devices (e.g., cellular phones) that function as control points to manage network resources. EX1009, ¶¶28, 44. *Pandya*'s control-point devices provide traffic-control mechanisms to dynamically allocate bandwidth usage within the distributed network. EX1009, ¶¶28, 77; EX1003, ¶50.

## **6. Overview of *Sewall* '327**

*Sewall* '327 discloses a personal hotspot device that multiple devices may use to connect to the internet via a cellular telephone or other cellular data connection. EX1010, ¶2. The hotspot device may collect and maintain usage statistics for each individual device that uses the hotspot traffic-forwarding service. EX1010, ¶¶25-28. Monitoring usage of the hotspot traffic-forwarding service by individual devices can allow for more efficient allocation of network resources. EX1010, ¶7; EX1003, ¶51.

## **7. Overview of *Trossen***

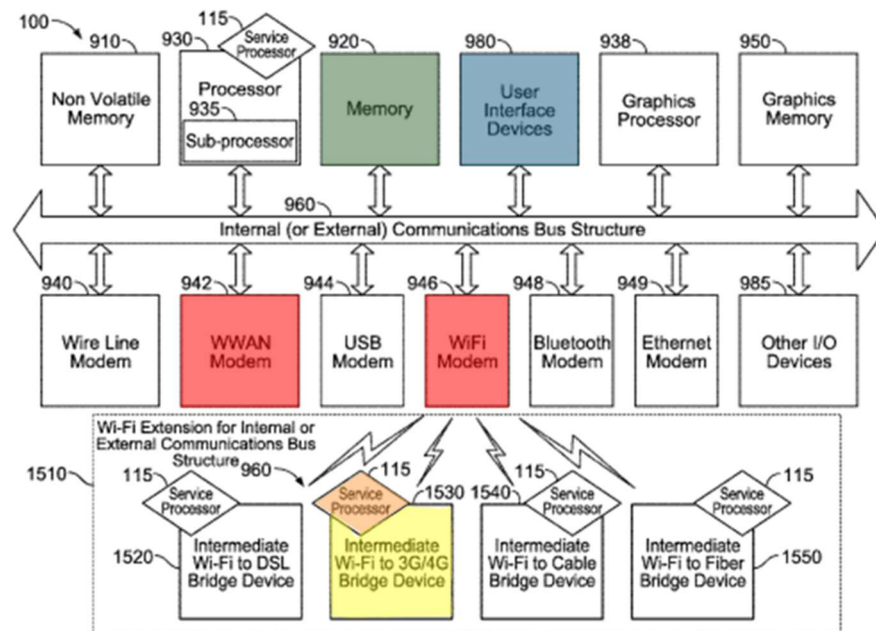
*Trossen* discloses establishing a service-provisioning relationship between a user device and a bridging-user device through a wireless network. EX1011, Abstract. A message including cost information is sent to the originating user. EX1011, ¶28. The originating user of *Trossen* can accept or reject the identified cost. EX 1011, ¶30. An offer-counteroffer model of negotiation between the originating user and the bridging user may continue with user input. EX1011, ¶31; EX1003, ¶52.

### III. The '102 Patent

The '102 patent was filed on November 15, 2012, and claims priority to a provisional application filed January 28, 2009.<sup>1</sup> EX1001, cover.

#### A. Overview

The '102 patent discloses a system that allows an end-user device to be used as an intermediate networking device. EX1001, 32:38-48, 35:24-33. Figure 15 reflects the purported invention:



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

EX1001, Fig. 15A (annotated). 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 no prior-art-based rejections. The Examiner issued only an indefiniteness rejection, which Applicant overcame, and then allowed the claims. EX1002, 193. EX1002, 193, 187, 165; EX1003, ¶43.

### **IV. Level of Ordinary Skill**

A person of ordinary skill in the art (“POSITA”) at the ’102 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, ¶¶53-54. More related education may compensate for fewer years of work experience (and vice versa). *Id.*

### **V. Claim Construction**

Claims in an IPR are construed under the *Phillips* standard. 37 C.F.R. §42.100(b). For purposes of this Petition, no terms need to be expressly construed.

EX1003, ¶55. Petitioner reserves the right to respond to any claim-construction arguments Patent Owner raises.

## **VI. Statement of Precise Relief Requested**

Petitioner requests review under 35 U.S.C. §311 of claim 1 claims 1-30 of the '102 patent based on the following unpatentability grounds.

|          | <b>References</b>                  | <b>Basis</b> | <b>Challenged Claims</b>       |
|----------|------------------------------------|--------------|--------------------------------|
| <b>1</b> | <i>Thomas</i>                      | §102         | Claim 1, 2, 5, 7, 8, and 10-15 |
| <b>2</b> | <i>Thomas, Sewall</i>              | §103         | Claims 1, 2, 4-8, and 10-19    |
| <b>3</b> | <i>Thomas, Sewall, Boudreau</i>    | §103         | Claim 3                        |
| <b>4</b> | <i>Thomas, Sewall, Burnett</i>     | §103         | Claims 9, 29, and 30           |
| <b>5</b> | <i>Thomas, Sewall, Pandya</i>      | §103         | Claims 20 and 21               |
| <b>6</b> | <i>Thomas, Sewall, Sewall '327</i> | §103         | Claims 22-25                   |
| <b>7</b> | <i>Thomas, Sewall, Trossen</i>     | §103         | Claims 26-28                   |

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 '102 patent (January 28, 2009):

|                               |                                                                                                                 |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>EX1005</b><br>§102(a), (e) | U.S. Patent Publication 2009/0017789 (“ <i>Thomas</i> ”), filed January 22, 2008, published January 15, 2009.   |
| <b>EX1006</b><br>§102(a), (e) | U.S. Patent Publication 2008/0039102 (“ <i>Sewall</i> ”), filed February 12, 2007, published February 14, 2008. |
| <b>EX1007</b><br>§102(e)      | U.S. Patent Publication 2009/0028049 (“ <i>Boudreau</i> ”), filed July 11, 2008, published January 29, 2009.    |
| <b>EX1008</b><br>§102(b)      | U.S. Patent No. 9,691,082 (“ <i>Burnett</i> ”), filed March 19, 2008, published June 27, 2017.                  |
| <b>EX1009</b><br>§102(b)      | U.S. Patent Publication 2004/0103193 (“ <i>Pandya</i> ”), filed November 7, 2003, published May 27, 2004.       |
| <b>EX1010</b><br>§102(a), (e) | U.S. Patent Publication 2008/0313327 (“ <i>Sewall</i> ’327”), filed July 14, 2008, published December 18, 2008. |
| <b>EX1011</b><br>§102(b)      | U.S. Patent Publication 2005/0197098 (“ <i>Trossen</i> ”), filed March 2, 2004, published September 8, 2005.    |

**A. Ground 1: Claims 1, 2, 5, 7, 8, and 10-15 Are Anticipated by  
*Thomas***

**1. Claim 1**

*Thomas* discloses each and every element of claim 1 and therefore anticipates it. EX1003, ¶82.

**a. 1[pre]: “An end-user device, comprising:”**

*Thomas* discloses 1[pre]. EX1003, ¶56. It 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. It describes a cellular phone as providing such services in Figures 5 and 6. *Id.*, ¶¶44-46, 52.

**b. 1[a]: “one or more modems for;”**

*Thomas* discloses 1[a]. EX1003, ¶¶57-59. As with any internet or WLAN enabled cellular or mobile device, *Thomas*’s wireless device includes a modem for connecting to the internet (e.g., over a wireless connection) and communicating with other computing devices (e.g., via a Wi-Fi or WLAN network). EX1005, ¶33. As shown in Figure 3, *Thomas*’s wireless device 110 includes a radio-frequency front-end component 300 providing for bidirectional communication, as well as a wireless-network-radio front-end component 318. *Id.*, ¶¶33-34. It discloses that a DSP 304 “**modulates and demodulates data**”—i.e., a modem—to process data transmissions to and from the wireless device. *Id.* (emphases added); EX1003,

¶¶57-59. Wireless device 110 may also provide connectivity in place of a cable or ADSL modem by serving as the modem instead. EX1005, ¶¶48, 51; EX1003, ¶58.

**c. 1[a][i]: “assisting the end-user device in communicating with a network system over a wireless access network, the network system comprising one or more network elements, and;”**

*Thomas* discloses 1[a][i]. EX1003, ¶60. The one or more modem(s) assist wireless device 110 in communicating with a network system such as cellular network 102 and the internet 104. EX1005, ¶¶24-25, Fig 1. That network system comprises network elements, including server 108 and other network elements. *Id.*; *see id.*, Figs. 2, 6 (“Cellular Infrastructure”).

**d. 1[a][ii]: “assisting the end-user device in communicating with one or more other devices over a wireless local-area network, a personal-area network, a near-field network, or a combination of these;”**

*Thomas* discloses 1[a][ii]. EX1003, ¶61 The one or more modem(s) assist wireless device 110 in communicating with one or more laptop devices over the recited networks, such as a WLAN. EX1005, ¶¶25-26. *Thomas* further discloses that wireless device 110 may communicate with other devices via a home network (i.e., a personal-area network), as well as near-field networks (e.g., Bluetooth or infrared). *Id.*, ¶¶28, 30, 48-51, 6; EX1003, ¶61.

**e. 1[b]: “memory configured to store a plurality of service policy settings, the plurality of service policy settings including a first service policy setting for authorizing the end-user device to provide a forwarding service to the one or more other devices, the forwarding service for forwarding traffic between the one or more other devices and the network system;”**

*Thomas* discloses 1[b]. EX1003, ¶¶62-69. *Thomas*’s wireless device 110 includes memory 308. EX1005, ¶34, Fig. 3. *Thomas*’s memory stores a client-access application 312 to provide application-level point-of-presence capabilities within the wireless device 110 to forward traffic to/from the other devices (e.g., laptops) and a network (e.g., the internet). EX1005, ¶¶34, 44-46, 52, Figs. 3, 5, 6; EX1003, ¶62.

*Thomas* also discloses a “forwarding service,” as claimed. EX1005, ¶¶34, 44-46, 52, Figs. 3, 5, 6; EX1003, ¶63. *Thomas* discloses that a client computing device is “allowed” to communicate normal traffic *through the wireless device 110* to reach a network. EX1005, ¶47. Wireless device 110 may also “act as a bridge for traffic” between another device and the internet. EX1005, ¶84. It may also “route” packets between a laptop and the internet. EX1005, ¶86. Dependent claim 2 of the ’102 patent confirms that *Thomas*’s disclosed features are a “forwarding service.” EX1001, claim 2.

The memory of *Thomas*’s end-user device is configured to store—and indeed does store—a first service-policy setting for authorizing the end-user device

to provide a forwarding service, as claimed. EX1003, ¶64. As shown in Figure 7, *Thomas* discloses that when the user of wireless device 110 starts application 312 to enable the forwarding service, the wireless device 110 first obtains authorization from a network element such as server 108. EX1005, ¶¶57-60. The initial or default policy service setting at wireless device 110 regarding the forwarding service is thus *unauthorized*. *Id.*; EX1003, ¶64.

Wireless device 110 may send a start message to server 108, which determines whether authorization should be granted. EX1003, ¶65. If granted, the server may return a start message to the wireless device 110 providing configuration information for the forwarding service. EX1005, ¶¶57-60 (returned parameter set indicating whether the forwarding service is “*okay to run or whether it should never start*”), Fig. 7. Wireless device 110 may then change its first service-policy setting to *authorized*, initiate application 312, and provide the forwarding service. *Id.*

This authorization “setting” remains in place during the forwarding service session. EX1005, ¶¶57-60; EX1003, ¶66. Indeed, wireless device 110 may resend stored packets if it does not receive acknowledgements from upstream devices (e.g., laptops)—i.e., there is no need to obtain reauthorization. EX1005, ¶¶85, 64 (after establishing authorization, a session can accommodate multiple client devices and end once the last client terminates communications).

*Thomas* further discloses that its wireless device may change authorization settings (i.e., another “first service policy setting”) for providing the forwarding service on an individual user-by-user basis. EX1005, ¶¶44-46 (“wireless device 110 is provided with a user interface to allow or disallow access to a connection”), 52, Fig. 5; *see also id.*, ¶85; EX1003, ¶67.

The memory of *Thomas*’s wireless device 110 stores a “plurality of service policy settings,” as claimed. EX1003, ¶68. The first-service policy may have multiple settings: *unauthorized* or *authorized*. EX1005, ¶¶57-60, Fig. 7. *Thomas* also discloses a variety of other service-policy settings for the forwarding service, including message types, cell identifiers, software versions, service levels, random identifiers to match with a later stop message, number of available IP addresses, lease time, remaining data amounts, byte counts, billing, usage-metering, QoS, and port restrictions, among other traffic-control features. *Id.*, ¶¶53-60.

Accordingly, *Thomas* discloses all features of 1[b]. EX1003, ¶69.

**f. 1[c]: “a user interface; and”**

*Thomas* discloses 1[c]. EX1003, ¶70. As shown in Figure 3, wireless device 110 includes a display 314 and a user input device 316. EX1005, ¶34. Exemplary user interfaces are also disclosed in Figures 5, 6, 9, and 10. EX1005, ¶¶44-46, 52, 76-77.

**g. 1[d]: “one or more processors configured to execute one or more instructions that, when executed by the one or more processors, cause the one or more processors to:”**

*Thomas* discloses 1[d]. EX1003, ¶71. As shown in Figure 3, *Thomas* discloses that its wireless device 110 includes a processor 306 that provides computational and processing capabilities for the wireless device. EX1005, ¶33.

**h. 1[d][i]: “at least assist to obtain configuration information from the one or more network elements, the configuration information instructing the one or more processors to modify or to allow modification of the first service policy setting,”**

*Thomas* discloses 1[d][i]. EX1003, ¶¶72-75. To request authorization to provide its point-of-presence forwarding service, *Thomas*’s wireless device 110 starts client application 312 and sends a start message to server 108 (a “network element”). EX1005, ¶¶57-58; EX1003, ¶72. If wireless device 110 is authorized server 108 sends a response to wireless 110 with configuration information. EX1005, ¶59 (disclosing, e.g., “parameters” such as message type, response, service level, and others), Fig. 7. Such information may instruct the wireless device’s processor to modify the first-policy setting from *unauthorized* to *authorized* (i.e., “okay to run or never start”) and start application 312. *Id.*, ¶¶59-60, Fig. 7. As discussed above, this authorization “setting” remains in place during the forwarding-service session. *See* EX1005, ¶¶85, 64; EX1003, ¶73.

*Thomas* additionally discloses obtaining configuration information from network elements for authorizing wireless device 110 to provide its forwarding service on an individual user-by-user basis. EX1005, ¶¶44-46, 52, Figs. 5, 6; EX1003, ¶74. For example, a computing device seeking access to the internet through wireless device 110 may initiate a request, which is passed to a service provider. EX1005, ¶52. Wireless device may then obtain configuration information via the service provider (“network elements”), allowing modification of the service-policy setting from *unauthorized* to *authorized* to provide the forwarding service to the device. *Id.* This authorization “setting” remains in place during the forwarding-service session. EX1003, ¶75; EX1005, ¶85.

**i. 1[d][ii]: “at least assist to obtain, through the user interface, a user input associated with enabling or disabling the forwarding service, and”**

*Thomas* discloses 1[d][ii]. EX1003, ¶¶76-78. Wireless device 110 may obtain user input to initiate startup and shutdown messages for enabling or disabling the forwarding service. EX1005, ¶¶76-77 (“a startup or shutdown message display sequence ... [may] be presented on the user interface 1000”), Fig. 9 (showing the forwarding service as “ON”), Fig. 10 (same); EX1003, ¶76. Indeed, via such user input, the “user” of wireless device 110 may start application 312 to turn on the forwarding service or stop application 312 to turn it off. EX1005, ¶¶34, 58, 65. A POSITA would understand *Thomas* discloses that such

direct action by the user occurs by obtaining user input through wireless device 110's user interface. EX1003, ¶77.

*Thomas* also discloses enabling or disabling the forwarding service based on user input on an individual user-by-user basis. EX1003, ¶78. It discloses that wireless device 110 has a user interface for obtaining user input to allow or disallow access to other computing devices. EX1005, ¶¶44-46, 52, Fig. 5.

**j. 1[d][iii]: “modify a second service policy setting of the plurality of service policy settings in accordance with the user input, the second service policy setting for at least assisting in enabling or disabling the forwarding service.”**

*Thomas* discloses 1[d][iii]. EX1003, ¶¶79-81. *Thomas* discloses a second service-policy setting for its forwarding service, e.g., an on-or-off setting. EX1003, ¶79. This second service-policy setting is reflected in wireless device 110's user interface. EX1005, ¶¶76-77, Figs. 9, 10 (forwarding service “ON”).

In accordance with the user input (*supra* §VI.A.1.i), user device 110 may modify the second policy setting to assist in enabling or disabling the forwarding service (e.g., turning it on or off). EX1003, ¶80. To enable or disable the forwarding service, the user of wireless device 110 starts or stops the client-access application 312. EX1005, ¶¶58, 65. For example, after exchanging stop messages with server 108, wireless device 110 may terminate the session, changing the second service-policy setting to *off*. *Id.*

Accordingly, *Thomas* discloses all limitations and anticipates claim 1.

EX1003, ¶81.

**2. Claim 2: “wherein forwarding traffic comprises passing, bridging, routing, traffic shaping, or otherwise allowing the traffic.”**

*Thomas* discloses claim 2. EX1003, ¶82. *Thomas* discloses its wireless device as *bridging, routing*, and otherwise *allowing* traffic. EX1005, ¶¶47, 84-85.

**3. Claim 5: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to obtain a user request, and wherein obtain configuration information is based on the user request.”**

*Thomas* discloses claim 5. EX1003, ¶¶83-84. The user interface of *Thomas*’s wireless device 110 may obtain a user request to initiate a startup message for the forwarding service (i.e., by running application 312). EX1005, ¶¶34, 58-59, 76-77, Figs. 9, 10. The start message is received at server 108, the server “determines whether the *requesting* wireless device 110 is authorized” and, if so, returns configuration information to wireless device 110. EX1005, ¶59, Fig. 7. Accordingly, *Thomas* discloses that wireless device 110 obtains configuration information based on the user request, as claimed. EX1003, ¶83.

*Thomas* also discloses wireless device 110 obtaining configuration information based on a request from a user of a device seeking access to the forwarding service. EX1005, ¶¶46, 52; EX1003, ¶84. Such a request “may appear

on the display 314 on the wireless device 110.” EX1005, ¶46. The wireless device 110 may then obtain configuration information, including authorization to extend the forwarding service to the computing device. EX1005, ¶¶46, 52-53.

**4. Claim 7: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to: at least assist to present, through the user interface, a notification associated with the first service policy setting.”**

*Thomas* discloses claim 7. EX1003, ¶¶85-86. *Thomas* discloses that the processors are caused to present, through the user interface, notifications associated with its first policy-service (authorization) settings. These include notifications about data-transfer amounts or session duration, as well as authorized devices. EX1005, ¶¶44-46, 76-77, Figs. 9, 10 (“TOM’S LAPTOP”). These notifications are associated with the first service-policy setting set to *authorized*, as is necessary to establish a forwarding-service session. EX1005, ¶¶57-60; EX1003, ¶85.

The notifications further include “a startup or shutdown message display sequence.” EX1005, ¶76, Fig. 9. These are associated with the authorization policy setting because the startup messages involve requesting authorization from server 108, and a shutdown returns the authorization setting for wireless device 110 to *unauthorized* because the wireless device would need to request authorization for the next forwarding-service session. *See* EX1005, ¶¶59, 65; EX1003, ¶86.

**5. Claim 8: “wherein the notification comprises information associated with activating the forwarding service.”**

*Thomas* discloses claim 8. EX1003, ¶87. *Thomas* discloses notifications that include a “startup ... message display sequence” associated with activating the forwarding service, as the startup messages involve requesting authorization from server 108 to run application 312. EX1005, ¶¶59, 77, Fig. 10. The notifications also include an “activation status” indicating if the forwarding service is on, as well as notifications of authorized devices. EX1005, ¶¶76-77, Figs. 9, 10 (“TOM’S LAPTOP”), *id.*, ¶¶44-46, Fig. 5. They further include data-transfer and session-duration notifications from which a user would recognize successful activation. EX1005, ¶¶76-77, Figs. 9, 10; EX1003, ¶87.

**6. Claim 10: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to present, through the user interface, a notification associated with the forwarding service.”**

*Thomas* discloses claim 10. EX1003, ¶88. *Thomas* discloses a user interface providing notifications associated with the forwarding service. EX1005, ¶¶76-77, Figs. 9, 10. The notifications include a “startup ... message display sequence” for requesting authorization to provide the forwarding service. EX1005, ¶¶59, 77, Fig. 10. They also include an “activation status” indicating whether the forwarding service is on or off, identifications of authorized computer devices, session

duration, and data-transfer amounts. EX1005, ¶¶76-77, 44-46, Figs. 5, 9, 10; EX1003, ¶88.

**7. Claim 11: “wherein the notification comprises information about a usage or cost associated with the forwarding service.”**

*Thomas* discloses claim 11. EX1003, ¶89. *Thomas* discloses presenting, through a user interface, notifications including information identifying the data-transfer amounts and forwarding-service session duration, as well as authorized users of the forwarding service (i.e., “usage”). EX1005, ¶¶44-46, 76-77, Figs. 5, 9, 10; EX1003, ¶89. A skilled artisan would also recognize the data counter to be associated with forwarding-service costs under a service subscription. EX1005, ¶¶54-56; EX1003, ¶89.

**8. Claim 12: “wherein the notification comprises information about the forwarding service.”**

*Thomas* discloses claim 12 for essentially the same reasons as for claim 10 above in Section VI.A.6. EX1005, ¶¶44-46, 59, 76, 77, Figs. 5, 9, 10 (notifications about “activation status,” identifying authorized devices, duration, and data usage); EX1003, ¶90.

**9. Claim 13: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to control at least an aspect of the forwarding service.”**

*Thomas* discloses claim 13. EX1003, ¶¶91-92. *Thomas* discloses that its wireless device 110 may control at least an aspect of the forwarding service, such as assisting a user to configure aspects of a service usage policy or a security aspect. EX1003, ¶91; *see also* EX1001, claim 18. These include client auto-connection capabilities, automatic shutdown features, and setting-restoration upon reconnection or power up. EX1005, ¶68. *Thomas* further discloses other configuration options including “security features.” EX1005, ¶¶68-70.

*Thomas*’s wireless device may also be programmed to only accept computer traffic from a select number of computing devices, auto-disconnect features, compensation-dependent access, service levels for controlling the number of concurrent users, security features, and access restrictions. EX1005, ¶¶46, 44, 50, 54-56, 69-70; EX1003, ¶92.

**10. Claim 14: “wherein control at least an aspect of the forwarding service comprises limit a number of devices comprising the one or more other devices.”**

*Thomas* discloses claim 14. EX1003, ¶93. It discloses implementing service levels for controlling the number of concurrent forwarding-service users. EX1005, ¶69. The wireless device may also be programmed to accept computer traffic from

a select number of computing devices and disallow access to others. EX1005, ¶¶46, 44.

**11. Claim 15: “wherein control at least an aspect of the forwarding service comprises restrict, or assist at least one of the one or more other devices to restrict, usage of the forwarding service by the at least one of the one or more other devices.”**

*Thomas* discloses claim 15. EX1003, ¶94. *Thomas*’s wireless device may control the forwarding service by restricting its usage by other devices. For example, usage may be metered based on duration of a computing device’s connection to the forwarding service, number and size of packets transmitted, and other factors such as peak or off-peak usage. EX1005, ¶54. The wireless device may also be programmed to accept computer traffic from a select number of computing devices and allow or disallow access. EX1005, ¶¶46, 44.

**B. Ground 2: Claims 1-2, 4-8 and 10-19 Are Obvious over *Thomas* and *Sewall***

**1. Motivation to Combine *Thomas* and *Sewall* with a Reasonable Expectation of Success**

*Thomas* and *Sewall* are analogous art to the ’102 patent. EX1003, ¶95. 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; EX1006, ¶¶3, 7-8, 11, Figs. 1-9. They also share a common goal with the ’102 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). EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1006, Abstract, ¶¶7-9, 17, 22, 25, 28-31; EX1001, 32:38-34:64, 65:31-67, 123:6-27, Fig. 15A-F; EX1003, ¶96.

A skilled artisan would have been motivated to combine *Thomas* and *Sewall* for several reasons. EX1003, ¶97. First, both references describe complementary features for controlling or limiting access to their personal-hotspot services. *Thomas* provides a user interface so users can identify and select other computing devices (e.g., laptops) to access the service. EX1003, ¶103; EX1005, ¶¶44-46, Figs. 5, 6. *Sewall* discloses configuring a mobile hotspot with user profiles (e.g., owner, authorized user, anonymous user) that provide access, limit access, or deny access to the hotspot service, which are implemented by, e.g., *Sewall*'s hotspot limiter, configuration data, user-interface data, and access engine components. EX1006, ¶¶47-50.

A POSITA would have been motivated to implement a combination with both *Thomas*'s and *Sewall*'s access-control features. EX1003, ¶104. Using a user interface to make “on-the-fly” determinations would improve the flexibility and customizability of *Sewall*'s profile-based access configurations, including during

conditions in which the hotspot operator may desire to deviate from default access rules (e.g., during roaming sessions, if network bandwidth is low, or based on needs of a given hotspot session). EX1003, ¶104; EX1005, ¶¶29, 54-56, Figs. 5, 6. A POSITA would have also recognized the benefits of implementing *Sewall*'s user profiles with *Thomas*'s wireless device 110 so that trusted devices (e.g., the wireless device 110 owner's other devices) could easily and quickly access the hotspot service without requiring manual approval from wireless device 110.

Second, *Thomas* and *Sewall* provide complementary billing and reward systems encouraging mobile-device users to provide hotspot services. EX1003, ¶101. *Thomas* describes a wireless-carrier "reward" plan for sharing internet access. EX1005, ¶¶55-56. *Sewall* describes a billing agent where other devices can directly compensate the hotspot owner. EX1006, ¶¶28-32.

One of skill would have been motivated to implement a combination with both *Thomas*'s wireless carrier "reward" and *Sewall*'s billing agent features. EX1003, ¶102. These complementary reward systems incentivize mobile users to provide hotspot services without being responsible for any increased data or bandwidth costs. EX1003, ¶102. Moreover, combining these features provides for increased flexibility and encouragement to extend hotspot services by potentially compensating the owner of *Thomas*'s wireless device 110 or *Sewall*'s hotspot

owner with payments from either the wireless carrier, other hotspot users, or both. EX1003, ¶102.

A skilled artisan would also have been motivated to combine the disclosures of *Thomas* and *Sewall* with a reasonable expectation of success in view of their several highly compatible features. EX1003, ¶97. Both references describe the same types of devices, such as internet-enabled cellular telephones, for providing internet access to other computing devices. EX1006, ¶7, Figs. 1, 2; EX1005, ¶¶2, 9, Figs. 5, 6; EX1003, ¶98. Both references also provide solutions for flexibly extending internet access without requiring all users to have their own wireless-plan subscriptions. EX1006, ¶¶2-3, 22; EX1005, ¶¶32, 54-56, 83; EX1003, ¶99. Both references also advantageously support using mobile devices' WLAN capabilities to provide hotspot services to a greater number of computing devices than was previously possible using Bluetooth or infrared connections, which may have greater range and/or number-of-user restrictions. EX1005, ¶¶27-28; EX1006, ¶¶14, 18; *see* EX1001, 33:45-67, Fig. 15A (depicting the claimed invention as encompassing use of Bluetooth); EX1003, ¶100.

For any or all of the potential benefits detailed above, a skilled artisan would have been motivated to combine *Thomas* and *Sewall* with a reasonable expectation of success. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007) (“[A]ny need or problem known in the field . . . can provide a reason for combining the elements

in the manner claimed.”). Indeed, combining their disclosures was within a POSITA’s capabilities and would predictably apply known techniques (e.g., hotspot access controls, billing services, etc.) to known mobile devices to provide “conventional” hotspot services allowing other computing devices to access the network systems such as the internet. EX1003, ¶105.

## **2. Claim 1**

Claim 1 would have been obvious over *Thomas* and *Sewall*. EX1003, ¶¶106-150.

### **a. 1[pre]: “An end-user device, comprising:”**

*Thomas* discloses 1[pre]. *Supra* §VI.A.1.a; EX1003, ¶106.

*Sewall* also discloses 1[pre]. EX1003, ¶107. It discloses using an internet-enabled cellular telephone as a “personal hotspot” so that other computing devices can access the internet. EX1006, ¶¶7, 16, Figs. 1, 2.

### **b. 1[a]: “one or more modems for;”**

*Thomas* discloses 1[a]. *Supra* §VI.A.1.b; EX1003, ¶¶108-109.

*Sewall* also discloses modems, referred to as “data exchangers,” in its hotspot devices. EX1006, ¶¶10, 16 (disclosing that data exchanger 20 and personal hotspot 10 are incorporated in the same device). EX1003, ¶¶110-111. Indeed, *Sewall* discloses that DSL and cable modems are examples of such data exchangers. EX1006, ¶10.

**c. 1[a][i]: “assisting the end-user device in communicating with a network system over a wireless access network, the network system comprising one or more network elements, and;”**

*Thomas* discloses 1[a][i]. *Supra* §VI.A.1.c; EX1003, ¶¶112-113.

*Sewall* also discloses 1[a][i]. EX1003, ¶114. *Sewall*’s modem(s) (“data exchangers”) assist the end-user device to communicate with the internet via internet service provider 22 (“network elements”). EX1006, ¶¶11, 16, 12 (ISP 22 is “any infrastructure” for providing internet-related services).

**d. 1[a][ii]: “assisting the end-user device in communicating with one or more other devices over a wireless local-area network, a personal-area network, a near-field network, or a combination of these;”**

*Thomas* discloses 1[a][ii]. *Supra* §VI.A.1.d; EX1003, ¶¶115-116.

*Sewall* also discloses 1[a][ii]. EX1003, ¶¶117. It discloses a local link 18 comprising a cable, wireless, infrared, radio-frequency, or other links between the personal hotspot device and other end-user devices. EX1006, ¶¶10, 16, Figs. 1, 2; EX1003, ¶117.

**e. 1[b]: “memory configured to store a plurality of service policy settings, the plurality of service policy settings including a first service policy setting for authorizing the end-user device to provide a forwarding service to the one or more other devices, the forwarding service for forwarding traffic between the one or more other devices and the network system;”**

*Thomas* discloses 1[b]. *Supra* §VI.A.1.e; EX1003, ¶118-124.

*Sewall* also discloses 1[b] in aspects included in the combination with *Thomas*. EX1003, ¶125-129. *Sewall* discloses an end-user device with a memory storing a hotspot limiter, configuration data, user-interface data, and profile, access, and billing engines. EX1006, ¶¶22-23, 58. With these features, the end-user device stores a plurality of service-policy settings, including internet-access rules, user profiles for different user types, access-blocking rules, and other traffic-control features. EX1006, ¶¶22-27. It also discloses billing and payment service-policy settings. EX1006, ¶¶28-32; EX1003, ¶125.

*Sewall* discloses a first service-policy setting for authorizing the hotspot device to provide a forwarding service. EX1003, ¶126. It may send a request containing identification information to a service provider, seeking configuration data for providing the forwarding service to other devices. EX1006, ¶¶43-44 (determining “*if* and/or *what* configuration data is to be returned”). If authorized, the hotspot device receives configuration data for providing the forwarding service and limits access according to the configuration data. *Id.*

The hotspot device may also change authorization settings on an individual user-by-user basis. EX1003, ¶127. It includes a limiter 40, which may distinguish among users and apply different access rules. EX1006, ¶22. Certain access rules (i.e., service-policy settings) may apply to devices owned by the hotspot owner. *Id.* Other access rules may apply to “users authorized by the owner.” *Id.* Other users

may be anonymous and, as such, unauthorized and blocked from accessing the hotspot. *Id.* EX1006, ¶36. One way for anonymous users to obtain access to the hotspot is to change their authorization policy setting by submitting payment information to gain hotspot access. EX1006, ¶29.

The end-user's hotspot service is a "forwarding service," as claimed. EX1003, ¶¶128-129. The hotspot device is "a device through which communications can be *routed* between client devices and the internet." EX1006, Abstract (emphasis added). Indeed, *Sewall*'s devices contain a router for routing inbound and outbound network traffic between other devices and a network system such as the internet. EX1006, ¶20, Fig. 3. Accordingly, *Sewall* also discloses all features of 1[b].

**f. 1[c]: "a user interface; and"**

*Thomas* discloses 1[c]. *Supra* §VI.A.1.f; EX1003, ¶130.

*Sewall* also discloses 1[c]. EX1003, ¶131. Figure 1, for example, discloses a cellular phone with a user interface functioning as a data exchanger to provide a personal hotspot to other devices. EX1006, ¶¶11, 16 (the phone/data exchanger and hotspot may be the same device).

**g. 1[d]: "one or more processors configured to execute one or more instructions that, when executed by the one or more processors, cause the one or more processors to:"**

*Thomas* discloses 1[d]. *Supra* §VI.A.1.g; EX1003, ¶132.

*Sewall* also discloses 1[d]. EX1003, ¶133. Its personal-hotspot features may be implemented on a computer/processor-based system. EX1006, ¶58.

**h. 1[d][i]: “at least assist to obtain configuration information from the one or more network elements, the configuration information instructing the one or more processors to modify or to allow modification of the first service policy setting,”**

*Thomas* discloses 1[d][i]. *Supra* §VI.A.1.h; EX1003, ¶¶134-137.

*Sewall* explains how the combination would implement *Sewall*’s profile-based access, satisfying 1[d][i]. EX1003, ¶138-140. The combination’s processor may send a request to a service provider, seeking configuration data for providing the forwarding service to other devices. EX1006, ¶¶43-44, 16; EX1003, ¶138. The service provider may then determine if authorization is warranted. EX1006, ¶44 (determining “*if* and/or *what* configuration data is to be returned”). If authorized, the hotspot device obtains configuration data from the service provider for providing the forwarding service, changing the policy setting to *authorized*. *Id.*

*Sewall* also explains how the combination would implement 1[d][i] on an individual user-by-user basis. EX1003, ¶139. The hotspot device includes a limiter 40, which may distinguish among users and apply different access rules. EX1006, ¶22; *see also supra* §VI.B.1. Some users can be “users authorized by the owner.” *Id.* Other users may be anonymous and, as such, unauthorized and blocked from access to the hotspot. *Id.*, ¶¶22, 36. Anonymous users may cause their

authorization-policy setting to be changed within the hotspot device by submitting payment information. EX1006, ¶¶29-31; EX1003, ¶140.

**i. 1[d][ii]: “at least assist to obtain, through the user interface, a user input associated with enabling or disabling the forwarding service, and”**

*Thomas* discloses 1[d][ii]. *Supra* §VI.A.1.i; EX1003, ¶¶141-143.

A POSITA also would have found 1[d][ii] obvious based on *Sewall*’s and *Thomas*’s combined disclosures. EX1003, ¶¶144-146. The combination’s end-user device for providing a personal hotspot may be a cellular phone with a user interface. *Supra* §VI.B.2.f; EX1003, ¶144. Its owner may enable a hotspot session by establishing a data connection with a service provider and obtaining configuration information. EX1006, ¶¶42-45, Fig. 7. *Sewall* discloses that the hotspot owner may participate in configuring the hotspot session. For example, the owner can select settings for configuration data as desired. EX1005, ¶45. A POSITA would reasonably expect such direct interaction to include user-selectable options through the combination’s user interface for enabling or disabling the forwarding service, just as *Thomas* discloses and suggests. *Id.*; EX1005, ¶¶76-77, 34, 58, 65. A POSITA would have been motivated to include these features in the combination so that users could further control profile-based access to the forwarding service, consistent with *Sewall*’s access-control goals. *Supra* §VI.B.1; EX1003, ¶145; EX1005, ¶5.

**j. 1[d][iii]: “modify a second service policy setting of the plurality of service policy settings in accordance with the user input, the second service policy setting for at least assisting in enabling or disabling the forwarding service.”**

*Thomas* discloses 1[d][iii]. *Supra* §VI.A.1.j; EX1003, ¶¶147-148.

A POSITA would have found 1[d][iii] obvious in view of *Thomas*’s and *Sewall*’s combined disclosures. EX1003, ¶¶149-150. As detailed above, it would have been obvious to include a user-selectable option to enable or disable the forwarding service, just as *Thomas* discloses. *Supra* §VI.B.2.i. It therefore also would have been obvious for the processors of the combination’s device to modify a second service-policy setting (i.e., turn the hotspot on or off) in accordance with such user input. *Id.*; EX1003, ¶149. Indeed, a POSITA would have been motivated with a reasonable expectation of success to include these standard features in the combination so that a personal hotspot could be manually turned on and off via user input to provide a flexible networking system. EX1003, ¶149.

For at least the reasons discussed above, claim 1 as a whole would have been obvious based on *Thomas* and *Sewall*. EX1003, ¶150.

**3. Claim 2: “wherein forwarding traffic comprises passing, bridging, routing, traffic shaping, or otherwise allowing the traffic.”**

*Thomas* discloses claim 2. *Supra* §VI.A.2; EX1003, ¶152.

*Sewall* also discloses claim 2. EX1003, ¶153. The combination's end-user device would function as a router for routing inbound and outbound network traffic. EX1006, ¶¶19-20, Fig. 3, Abstract.

Accordingly, claim 2 as a whole would have been obvious. EX1003, ¶151.

**4. Claim 4: “wherein the forwarding service is included in a service plan associated with the end-user device.”**

*Thomas* and *Sewall* disclose the additional features of claim 4 and thus render the claim obvious. EX1003, ¶154.

*Thomas* discloses or suggests that the user of wireless device 110 has a subscription service plan that includes providing the forwarding service. EX1005, ¶¶54-55 (the “subscriber” may be incentivized to provide the forwarding service via a “rewards incentive plan”); EX1003, ¶156.

*Sewall* also discloses that configuration data provided for the forwarding service can be customized based on the hotspot-device owner's subscription plan. EX1006, ¶¶25, 16. For example, a “basic subscription package might then have more stringent access rules than a premium subscription package.” EX1006, ¶25.

Accordingly, claim 4 as a whole would have been obvious. EX1003, ¶¶154-155.

**5. Claim 5: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to obtain a user request, and wherein obtain configuration information is based on the user request.”**

*Thomas* discloses claim 5. *Supra* §VI.A.3; EX1003, ¶¶158-159.

*Sewall* also discloses or suggests claim 5. EX1003, ¶¶160-162. The combination’s hotspot device may be a cellular phone with a user interface. *Supra* §VI.B.2.f. The hotspot owner may enable a hotspot session by requesting and obtaining configuration information. EX1006, ¶¶42-45 (“An HTTP GET request is an example of an active request” to the service provider), 25; EX1003, ¶¶160-161.

The hotspot owner may participate in configuring the hotspot session. EX1003, ¶162. The owner can select settings for configuration data as desired. EX1006, ¶45. Such direct user interaction through the combination’s user interface would, at a minimum, reasonably be expected to include a user-selectable option to request initiation of the forwarding service, just as *Thomas* discloses and suggests, and consistent with *Sewall*’s purpose. *Id.*; EX1003, ¶162; EX1006, ¶8.

Accordingly, the subject matter of claim 5 as a whole would have been obvious. EX1003, ¶157.

**6. Claim 6: “wherein the configuration information is based on a user preference.”**

*Sewall* discloses the additional features of claim 6 and thus renders the claim obvious. EX1003, ¶¶163-164.

*Sewall* discloses that the configuration information requested and received at the hotspot device, which would be included in the combination to implement the profile-based access, may be based on user preferences. EX1003, ¶164. Indeed, *Sewall* discloses that configuration information can be modified to conform to the hotspot owner’s preferences. EX1006, ¶¶45, 25. For example, the owner may prepare custom profiles based on the owner’s preferences for particular users of the personal hotspot. EX1006, ¶37 (the owner may “provide a spouse or personal friend with less limited access than other authorized users. That same owner may desire to provide a child with more limited access.”).

Accordingly, claim 6 as a whole would have been obvious. EX1003, ¶¶163-164.

**7. Claim 7: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to: at least assist to present, through the user interface, a notification associated with the first service policy setting.”**

*Thomas* discloses claim 7. *Supra* §VI.A.4; EX1003, ¶¶165-167. *Thomas* discloses presenting notifications associated with authorization policy settings

(e.g., data-transfer amounts, session duration, authorized-device identifications, and startup or shutdown messages) through a user interface. EX1005, ¶¶57-60, 76, 77, Figs. 9, 10; *id.*, ¶46 (a “request to use the wireless device 110 may appear on the display 314 of the wireless device” to accept or deny).

*Sewall*’s features in the combination further show claim 7 would have been obvious. EX1003, ¶168. The combination’s device may send a request containing identification information to a service provider. EX1006, ¶¶43-44, 16. The service provider may then determine if granting authorization is warranted. EX1006, ¶44. When configuration data is received at the hotspot device, the owner may edit it. EX1006, ¶¶25, 33-37. It would have been obvious to provide a notification through the combination’s hotspot interface, as *Thomas* discloses, about current configuration data for editing because doing so would allow the owner to make, timely observe, and/or confirm changes to the configuration data. EX1006, ¶36; EX1003, ¶168.

Accordingly, claim 7 as a whole would have been obvious. EX1003, ¶165.

**8. Claim 8: “wherein the notification comprises information associated with activating the forwarding service.”**

*Thomas* discloses claim 8. *Supra* §VI.A.5; EX1003, ¶170.

Claim 8 further would have been obvious based on *Thomas*’s combination with *Sewall*. EX1003, ¶171. When the configuration data is received at the hotspot

device, at least a portion of it may be editable by its owner. EX1006, ¶¶25, 33-37.

It would have been obvious to provide a notification to the owner that the configuration data has been received and is available for editing. EX1006, ¶¶36, 43-44; EX1003, ¶171. Such a notification would also be associated with activating the hotspot service, as it would inform the owner that authorization has been successful and the hotspot session is being configured. EX1003, ¶171.

Accordingly, claim 8 as a whole would have been obvious. EX1003, ¶169.

**9. Claim 10: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to present, through the user interface, a notification associated with the forwarding service.”**

*Thomas* discloses claim 10. *Supra* §VI.A.6; EX1003, ¶173.

Claim 10 further would have been obvious based on *Thomas*’s combination with *Sewall*. EX1003, ¶174. When configuration data is received at the combination’s hotspot device, the owner may edit it. EX1006, ¶¶25, 33-37. It would have been obvious to provide a notification to the owner that the configuration data has been received because doing so would allow the owner to make, timely observe, and/or confirm changes to it. EX1006, ¶36; EX1003, ¶174. Such notifications regarding the configuration data for establishing the forwarding service would be associated with the forwarding service, as claimed.

Accordingly, claim 10 as a whole would have been obvious. EX1003, ¶172.

**10. Claim 11: “wherein the notification comprises information about a usage or cost associated with the forwarding service.”**

*Thomas* discloses claim 11. *Supra* §VI.A.7; EX1003, ¶176.

Claim 11 further would have been obvious based on *Thomas*’s combination with *Sewall*. EX1003, ¶177. When configuration data is received at the combination’s hotspot device, the owner may edit it. EX1006, ¶¶25, 33-37. Such configuration data for the forwarding service may include user profiles with access rules limiting bandwidth usage and data transfer, which a subscription plan would also likely govern. *Id.* It would have been obvious to provide a notification to the owner that the configuration data has been received because doing so would allow the owner to make, timely observe, and/or confirm changes to it. EX1006, ¶36; EX1003, ¶177. Such notifications would be associated with usage or costs associated with the forwarding service, as claimed.

Accordingly, claim 11 as a whole would have been obvious. EX1003, ¶175.

**11. Claim 12: “wherein the notification comprises information about the forwarding service.”**

*Thomas* discloses claim 12. *Supra* §VI.A.8; EX1003, ¶179. The combination of *Thomas* and *Sewall* also renders obvious the additional features of claim 12 for essentially the same reasons as for claim 10. *Supra* §VI.B.9. It would have been obvious to provide a notification to the owner that configuration data about the forwarding service has been received. EX1006, ¶¶25, 33-37; EX1003, ¶180.

Accordingly, claim 12 as a whole would have been obvious. EX1003, ¶178.

**12. Claim 13: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to control at least an aspect of the forwarding service.”**

*Thomas* discloses claim 13. *Supra* §VI.A.9; EX1003, ¶¶183-184. *Sewall* also discloses claim 13. EX1003, ¶182.

The combination’s hotspot device includes *Sewall*’s limiter, which controls aspects of the forwarding service. EX1003, ¶182. The limiter applies *Sewall*’s profile-based access features that would work together with *Thomas* as detailed above, applying different internet access rules for different users. EX1006, ¶22. The limiter may specify upload and download bandwidth limits, limit the amount of data transfer allowed in a given time period, or limit the number of simultaneous users or sessions. *See, e.g.*, EX1006, ¶34.

Accordingly, claim 13 as a whole would have been obvious. EX1003, ¶181.

**13. Claim 14: “wherein control at least an aspect of the forwarding service comprises limit a number of devices comprising the one or more other devices.”**

*Thomas* discloses claim 14. *Supra* §VI.A.10; EX1003, ¶187. *Sewall* also discloses claim 14. EX1003, ¶186.

The combination’s hotspot device includes profile-based access limitations implemented by a hotspot limiter. EX1006, ¶22. The limiter may limit the number

of devices that can access the forwarding service, as claimed. EX1003, ¶186; EX1006, ¶¶34, 49.

Accordingly, claim 14 as a whole would have been obvious. EX1003, ¶185.

**14. Claim 15: “wherein control at least an aspect of the forwarding service comprises restrict, or assist at least one of the one or more other devices to restrict, usage of the forwarding service by the at least one of the one or more other devices.”**

*Thomas* discloses claim 15. *Supra* §VI.A.11; EX1003, ¶190. *Sewall* also discloses claim 15. EX1003, ¶189.

The combination’s hotspot device includes profile-based access limitations implemented by a hotspot limiter. EX1006, ¶22. The limiter may implement upload and download bandwidth limits, limit data transfer, or restrict usage based on duration of use. EX1006, ¶¶34, 49.

Accordingly, claim 15 as a whole would have been obvious. EX1003, ¶188.

**15. Claim 16: “wherein control at least an aspect of the forwarding service comprises restrict, or assist at least one of the one or more other devices to restrict, usage of the forwarding service by the at least one of the one or more other devices based on one or more of a device type, a modem type, a type of the wireless access network, a state of the wireless access network, an application, or a service activity.”**

*Thomas* and *Sewall* disclose the additional features of claim 16 and thus render the claim obvious. EX1003, ¶191.

As pertinent to claim 16, the '102 patent defines a “service activity” as including identifiers with which a computing device is communicating, as well as any service usage or traffic usage associated with a network communication end point, and characterizations of device usage (among any other categories of activity that can be “identified, monitored, recorded, reported, controlled, or processed in accordance with a set of verifiable service control policies”). EX1001, 6:64-7:15; EX1003, ¶192.

The combination’s personal hotspot device includes profile-based access limitations implemented by a hotspot limiter. EX1006, ¶¶22, 26. Depending on the device type or identifier associated with a device (e.g., an owner, authorized device, or anonymous device), the limiter may restrict usage by imposing upload and download bandwidth limits, limiting data transfer period, or limiting the number of devices accessing the hotspot. EX1006, ¶¶26, 34, 49; EX1003, ¶193.

*Thomas* also discloses restricting usage of the forwarding service based on an address, identifiers associated with computing devices, or categories of activity that may be identified, monitored, and controlled (e.g., a “service activity,” as claimed). EX1003, ¶194. For instance, the wireless device 110 may meter usage of the forwarding service based on duration of a computing device’s connection to the forwarding service, number and size of packets transmitted, and peak or off-peak usage. EX1005, ¶54. It may also restrict access based on a MAC address or by the

number of available IP addresses. EX1005, ¶¶59, 62; EX1001, 6:64-7:15 (defining “service activity” to include an “address”). The wireless device may also be programmed to accept computer traffic from a select number of computing devices and allow or disallow access. EX1005, ¶¶46, 44, 76-77, Figs. 9, 10.

Accordingly, claim 16 as a whole would have been obvious. EX1003, ¶191.

**16. Claim 17: “wherein control at least an aspect of the forwarding service comprises authorize or allow usage of the forwarding service by at least one of the one or more other devices based on one or more of a device type, a modem type, a type of the wireless access network, a state of the wireless access network, an application, or a service activity.”**

*Thomas* and *Sewall* disclose the additional features of claim 17, and these references therefore render the claim obvious. EX1003, ¶195.

Depending on the device type or identifier associated with a device (e.g., an owner, authorized device, or anonymous device), the limiter of the combination’s device may authorize or allow usage of the hotspot service, for example, by authorized or owner devices. But anonymous devices may have limited or no usage. EX1006, ¶¶22, 26, 34, 49; EX1003, ¶196.

*Thomas* also discloses authorizing or allowing usage, as claimed. EX1003, ¶197. Wireless device 110 may allow metered usage of the forwarding service based on duration of connection, number and size of packets transmitted, and other disclosed service activities. EX1005, ¶54. It may also allow access based on a

MAC address or up to the number of available IP addresses, or from a select number of computing devices. EX1005, ¶¶59, 62, 46, 44, 76-77, Figs. 9, 10.

Accordingly, claim 17 as a whole would have been obvious. EX1003, ¶195.

**17. Claim 18: “wherein at least assist to control the at least an aspect of the forwarding service comprises assist a user to configure one or more aspects of a service usage policy, a warning, or a security aspect.”**

*Thomas* and *Sewall* disclose the additional features of claim 18 and thus render the claim obvious. EX1003, ¶198.

*Thomas* discloses several user configuration settings for the combination’s device. EX1005, ¶68. These include aspects of service usage policies, including client auto-connection capabilities, automatic shutdown features, and restoration of settings upon reconnection or power up. *Id.* *Thomas* further discloses that “security features” may be configured for the wireless device 110. EX1005, ¶¶68-70 (e.g., device-connection control, Wi-Fi security, MAC-address restrictions, roaming, and power management); EX1003, ¶199.

The combination’s limiter may establish service-usage policies for the forwarding service, as claimed. EX1003, ¶200. It may specify upload and download bandwidth limits, limit the amount of data transfer allowed in a given time period, or limit the number of simultaneous users or sessions. *See, e.g.*, EX1006, ¶¶34, 49.

Accordingly, claim 18 as a whole would have been obvious. EX1003, ¶198.

**18. Claim 19: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to authorize or prevent usage of the forwarding service by at least one of the one or more other devices based on a credential.”**

*Thomas* and *Sewall* disclose the additional features of claim 19 and thus render the claim obvious. EX1003, ¶201.

The combination’s hotspot limiter may authorize or prevent usage of the hotspot service by another computing device based on a credential. EX1006, ¶¶22, 26. For example, the hotspot device may require a requesting device to supply “credentials” (e.g., username or password) used to determine whether to authorize or block access to the hotspot service. EX1006, ¶39; EX1003, ¶202.

*Thomas* also discloses authorizing or preventing usage of the forwarding service based on authorization “credentials” passed to a service provider. EX1005, ¶¶52-53; EX1003, ¶203. According to whether authorization is granted based on those credentials, wireless device 110 may authorize or block access to the forwarding service. *Id.* *Thomas* further discloses that authorization may be granted to devices based on credentials such as “device names, MAC addresses, or other identifying information for the connected client computing devices 114.” EX1005, ¶¶ 70, 46, 44, 76-77, Figs. 9, 10; EX1003, ¶204. Accordingly, claim 19 as a whole would have been obvious.

For at least the reasons detailed above, *Thomas* and *Sewall* render claims 1-2, 4-8 and 10-19 obvious, as a skilled artisan would have been motivated with a reasonable expectation of success in combining their disclosures in view of these references' highly compatible disclosures of the same or similar end-user devices, forwarding services, access and usage restrictions, and billing/incentive features. *Supra* §VI.B.1.

**C. Ground 3: Claim 3 Is Obvious over *Thomas* and *Sewall* in View of *Boudreau***

**1. Motivation to Combine *Thomas*, *Sewall*, and *Boudreau* with a Reasonable Expectation of Success**

As detailed above, *Thomas* and *Sewall* are analogous art to the '102 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* §VI.B.1; EX1003, ¶205. These references disclose end-user devices used for setting up a forwarding service, which can involve submitting and receiving sensitive information (e.g., identifying information, personal information, and other configuration information) to and from a server that the device user would desire to protect. EX1005, ¶53; EX1006, ¶23, 39.

*Boudreau* is also analogous art and in the same field of endeavor. EX1003, ¶206. It is directed to wireless system architectures that, like *Thomas* and *Sewall*, include servers and mobile wireless clients. EX1007, Figs. 1, 2A. *Boudreau*

discloses that communications between a server and a mobile wireless client should be secured (e.g., using data encryption) to protect sensitive information. EX1007, ¶¶49-52.

A skilled artisan would have been motivated to use a secure channel, as *Boudreau* discloses, to request and obtain configuration information from a network element (e.g., a server), as *Thomas* and/or *Sewall* disclose. EX1003, ¶207. Indeed, *Thomas* seeks to provide “a dynamic, *secure*, and flexible networking environment.” EX1005, ¶29. *Thomas* and *Sewall* also disclose that their end-user devices send and receive identifiers, profiles, and other authorization information that a skilled artisan would reasonably seek to maintain as confidential and secure from interception. EX1005, ¶¶58-59; EX1006, ¶¶44-45. Combining these references’ disclosures was within a POSITA’s skill and would predictably apply known techniques (e.g., secure communication channels) to known mobile client-server communications to reasonably provide a secure channel for *Thomas*’s and *Sewall*’s end-user devices to request and obtain configuration information for establishing “conventional” hotspot services. *KSR*, 550 U.S. at 420.

**2. Claim 3: “wherein obtain configuration information from the one or more network elements comprises obtain the configuration information over a secure control link.”**

Claim 3 depends from claim 1, which would have been obvious as discussed above. *Supra* §§VI.A.1, VI.B.2. *Thomas*, *Sewall*, and *Boudreau* render claim 3

obvious. EX1003, ¶208. *Thomas* and *Sewall* disclose receiving configuration information from the one or more network elements (e.g., a server). *Supra* §VI.B.2.h. As detailed above, a skilled artisan would have been motivated to provide a secure control link as *Boudreau* discloses so that the end-user devices of *Thomas* and *Sewall* can securely request and obtain configuration information to establish “conventional” hotspot services, as such requests and responses for configuration information include identifiers, profiles, and other authorization information that a skilled artisan would reasonably seek to maintain as confidential and secure from interception. *Supra* §VI.C.1VI.B.1; EX1003, ¶208.

Accordingly, claim 3 as a whole would have been obvious. EX1003, ¶208.

**D. Ground 4: Claims 9, 29, and 30 Are Obvious over *Thomas* and *Sewall* in View of *Burnett***

**1. Motivation to Combine *Thomas*, *Sewall*, and *Burnett* with a Reasonable Expectation of Success**

As detailed above, *Thomas* and *Sewall* are analogous art to the ’102 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* §VI.B.1. These references also disclose financial relationships or subscription plans between the end user and the service provider and providing notifications via user interfaces. EX1005, ¶54; EX1006, ¶25; EX1003, ¶209.

*Burnett* is also analogous art and in the same field of endeavor as the '102 patent. EX1003, ¶210. *Burnett* is directed to a wireless data device configured to access a wireless communications network. EX1008, 3:54-4:2. *Burnett* discloses that the communications network can include a service-personalization engine that facilitates subscription-update offers. EX1008, 4:42-57, 7:32-53. For example, the service-personalization engine can provide an up-sell offer. EX1008, 7:32-53. The up-sell offer can be sent as a “formatted message to the subscriber’s device 102, 104.” EX1008, 7:63-67, 8:25-49.

A skilled artisan would have been motivated to send information about a service plan that includes the forwarding service of *Thomas* and *Sewall* in a message with an update offer, as *Burnett* discloses. EX1003, ¶211. A skilled artisan would reasonably seek to provide such update-offer notifications to the end-user device when, e.g., a data limit or a cost threshold is being approached. *See, e.g.*, EX1008, 8:25-49. Combining these disclosures would have been within a POSITA’s skill and would predictably apply known techniques (e.g., notifications of update offers) to include information about a service plan including the forwarding service. It would have been compatible and conventional to include information about a service plan including the forwarding service in an update offer message to the end-user because such an update offer may recommend a service plan based on the subscriber’s usage history to minimize overage fees,

promote efficient use of the network resources, and ensure consistent network access to end-user devices. EX1003, ¶211.

**2. Claim 9: “wherein the notification provides information about a service plan that includes the forwarding service.”**

Claim 9 depends from claim 1, which would have been obvious as discussed above. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶212. *Thomas* and *Sewall* disclose an end-user device that provides a forwarding service and notifications, and is associated with subscription and incentive plans. *Supra* §§VI.B.2.e, VI.B.7; EX1005, ¶¶54-55; EX1006, ¶25; EX1003, ¶212.

*Burnett* discloses suggesting, “via an update offer,” that the user upgrade to an unlimited-data plan. EX1008, 8:37-49. The update offer of *Burnett* can be sent as a “formatted message to the subscriber’s device.” EX1008, 7:63-67, 5:33-47. Providing an update offer would have been desirable to potentially minimize overage fees, promote efficient use of the network resources, and ensure consistent network access to end-user devices. EX1008, 8:37-49; EX1003, ¶213.

Accordingly, claim 9 as a whole would have been obvious based on *Thomas*, *Sewell*, and *Burnett*. EX1003, ¶214.

**3. Claim 29: “wherein the notification comprises information about a service plan that includes the forwarding service.”**

Claim 29 depends from claim 10, which would have been obvious as discussed above. *Supra* §§VI.A.6, VI.B.9; EX1003, ¶215. *Thomas*, *Sewall*, and

*Burnett* disclose the additional features of claim 29 and thus render obvious claim 29 for essentially the same reasons discussed above for claim 9. *See supra* §VI.D.2; EX1003, ¶215.

**4. Claim 30: “wherein the information about the service plan comprises an offer for the service plan.”**

Claim 30 depends from claim 29, which would have been obvious as discussed above. *Supra* §VI.D.3; EX1003, ¶216.

*Thomas* discloses a financial relationship between the user (“subscriber”) and the service provider, including usage and incentive plans, and *Sewall* discloses a subscription plan, including a basic or premium subscription package. EX1005, ¶¶54-55; EX1006, ¶25. *Burnett*’s update offer can include an “up-sell offer” to purchase additional services, updates, or add-on services. EX1008, 7:40-53, 8:37-49. Providing an update offer would have been desirable to a skilled artisan for the same reasons discussed above. EX1008, 8:37-49; EX1003, ¶217.

Accordingly, claim 30 as a whole would have been obvious based on *Thomas*, *Sewall*, and *Burnett*. EX1003, ¶218.

**E. Ground 5: Claims 20 and 21 Are Obvious over *Thomas* and *Sewall* in View of *Pandya***

**1. Motivation to Combine *Thomas*, *Sewall*, and *Pandya* with a Reasonable Expectation of Success**

As detailed above, *Thomas* and *Sewall* are analogous art to the '102 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* §VI.B.1. These references disclose using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), which includes controlling traffic between the end-user devices, the other devices, and the network system. *See, e.g.*, EX1005, ¶¶49, 54; EX1006, ¶¶34, 36; EX1003, ¶219.

*Pandya* is also analogous art and in the same field of endeavor as the '102 patent. EX1003, ¶220. It is directed to a distributed network that includes servers and client devices. EX1009, ¶31. *Pandya* discloses control points 72 (an “end-user device”) and agent computers 70 associated with client computers deployed throughout distributed network 74. EX1009, ¶¶40, 42-44, Fig. 4. The control points (e.g., cellular phones) may provide traffic controls to optimize distribution of network resources, including re-allocating bandwidth and blocking or restricting various activities within the network, including at the packet and QoS level. EX1009, ¶¶44, 47-51, 77-78; EX1003, ¶220.

A skilled artisan would have been motivated to use *Pandya*'s traffic-control features implemented on end-user devices ("control points") with the end-user device of *Thomas* and *Sewall*. EX1003, ¶221. Combining their disclosures was within a POSITA's skill and would predictably apply known techniques (e.g., controlling traffic) to known mobile client-server communications to reasonably provide optimized use of network resources for *Thomas*'s and *Sewall*'s end-user devices and hotspot users. EX1003, ¶221. Such a combination would optimize use of network resources for *Thomas*'s and *Sewall*'s end-user device, for example, by dynamically adjusting bandwidth allocations based on changing network conditions to improve network services. It would have been compatible and conventional to use the traffic-control methods of *Pandya* to manage network access through *Thomas*'s and *Sewall*'s end-user devices to improve bandwidth management and maximize network performance. EX1003, ¶221.

## **2. Claim 20**

Claim 20 depends from claim 1, which would have been obvious. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶222. Its additional features also would have been obvious, as detailed below.

**a. 20[a]: “apply a first control to traffic between the end-user device and at least one of the one or more other devices, and”**

*Thomas*, *Sewall*, and *Pandya* render 20[a] obvious. EX1003, ¶¶223-224.

*Thomas* discloses applying a first control to traffic between the wireless device 110 and a client computing device 114. EX1003, ¶225. For example, *Thomas* discloses metering traffic according to duration of connection, number and size of packets sent or received, or other factors (such as peak or off-peak usage, or elevated quality of service requirements). EX1005, ¶54. It also discloses preventing or accepting traffic to particular devices. EX1005, ¶¶46, 49.

*Sewall* also discloses a limiter that implements access rules to, among other things, “specify upload and download bandwidth limits” and “limit the amount of data transfer allowed in a given time period.” EX1006, ¶¶22, 36; EX1003, ¶226.

To the extent Patent Owner disputes that *Thomas* and *Sewall* disclose the additional features of element 20[a], *Pandya* discloses them. EX1003, ¶227. For example, *Pandya* discloses control points 72 (the “end-user device”) and agents 70 associated with distributed client computers (the “one or more other devices”) deployed throughout distributed network 74. EX1009, ¶40. According to *Pandya*, the “control points coordinate and control the activity of the distributed agents within their domains.” EX1009, ¶42. Indeed, “a traffic control mechanism of the control point dynamically allocates bandwidth among the agents.” EX1009, ¶77.

The control points also implement policy-based QoS techniques, including to guarantee high levels of service. EX1009, ¶¶77-78, 47, 51. A skilled artisan would have been motivated to combine the traffic-control mechanisms of *Pandya* and implement them in the device of *Thomas* and *Sewall* as detailed above. *Supra* §VI.E.1; EX1003, ¶227.

**b. 20[b]: “apply a second control to traffic between the at least one of the one or more other devices and the network system,”**

*Thomas*, *Sewall*, and *Pandya* render 20[b] obvious. EX1003, ¶228. *Thomas* discloses applying a second control (e.g., authentication requirement) to traffic between one or more other devices and the network system. EX1003, ¶228. For example, *Thomas* discloses that a client computing device 114 may be required to provide “authentication credentials” that wireless device 110 may pass to the service provider. EX1005, ¶¶52-53. Authentication of the user device allows “communicat[ion] of normal traffic through the wireless device 110 to reach a network such as the Internet 104.” EX1005, ¶47.

*Sewall* also discloses limiting a “user’s duration of use,” “bandwidth available to a given user,” or “the amount of data a particular user or type of user can download in a given time period.” EX1006, ¶26; EX1003, ¶229. *Sewall*’s access engine may block communications once such a limit is reached. *Id.*

To the extent Patent Owner disputes that *Thomas* and *Sewall* disclose the additional features of element 20[b], *Pandya* discloses them. EX1003, ¶¶230-231; *supra* §VI.E.1. For example, *Pandya* discloses “traffic control components.” EX1009, ¶62. Specifically, *Pandya* discloses placing incoming and outgoing traffic from a distributed device “in an appropriate queue.” *Id.* These queues “release data for transmission to the network at regular intervals” based on “traffic control commands” (e.g., QoS parameters and service specifications) issued by a control point, thus applying a second control to traffic between the distributed client computers and the network. EX1009, ¶64.

**c. 20[c]: “wherein the first control differs from the second control.”**

*Thomas*, *Sewall*, and *Pandya* render 20[c] obvious. EX1003, ¶232. As detailed above, *Thomas*’s first control differs from *Thomas*’s second control. EX1003, ¶233. As detailed above, *Sewall*’s first control (in configuration data 42) also differs from *Sewall*’s second control (implemented by access engine 48). EX1003, ¶234. *Pandya*’s first control (e.g., dynamic-bandwidth allocation) also differs from *Pandya*’s second control (e.g., traffic-queue controls). EX1009, ¶¶62, 64, 77; EX1003, ¶235.

Accordingly, claim 20 as a whole would have been obvious. *Supra* §VI.E.1.

### 3. Claim 21

Claim 21 depends from claim 1, which would have been obvious. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶236. Its additional features also would have been obvious as detailed below. EX1003, ¶¶236-246.

**a. 21[a]: “apply a first control to first traffic, the first traffic being between the end-user device and the network system, and”**

*Thomas, Sewall, and Pandya* render 21[a] obvious. EX1003, ¶268. *Thomas* discloses applying a first control to first traffic between wireless device 110 and a network system. EX1003, ¶239. For example, a server 108 “determines whether the requesting wireless device 110 is authorized to operate within the network.” EX1005, ¶59. If authorized, a message may be sent to wireless device 110 that can include “number of available IP addresses, base IP address, lease time, short lease time, new software version, [and] data amount remaining” for the end-user device’s communications with the network system (e.g., including traffic forwarding). EX1005, ¶59.

*Sewall* also discloses a first control, as “personal hotspot 10 and data exchanger 20 negotiate a link” that includes “a connection to internet 26 via service provider 22.” EX1006, ¶43; EX1003, ¶240. The “service provider 22 can identify a data subscription plan paid for by the owner” and “limit[] access

according to the configuration data” associated with the subscription plan.

EX1006, ¶43.

To the extent Patent Owner disputes that *Thomas* and *Sewall* disclose the additional features of 21[a], *Pandya* discloses them. EX1003, ¶241. For example, *Pandya* discloses control points 72 (the “end-user device”) deployed throughout distributed network 74 (the “network system”). EX1009, ¶77. *Pandya*’s control points “implement policy based, QoS techniques by coordinating [] service level enforcement activities.” *Id.* The control points allocate bandwidth according to “network load, network population, and virtually any other parameter concerning network resources,” consistent with *Sewall*’s access limitations and *Thomas*’s recognition of data limits associated with the network system. EX1009, ¶78; EX1006, ¶43; EX1005, ¶59; *supra* §VI.E.1.

**b. 21[b]: “apply a second control to second traffic, the second traffic being between at least one of the one or more other devices and the network system,”**

*Thomas*, *Sewall*, and *Pandya* render obvious element 21[b] for the same reasons discussed above for element 20[b]. *Supra* §VI.E.2.b; EX1003, ¶242.

**c. 21[c]: “wherein the first control differs from the second control.”**

*Thomas*, *Sewall*, and *Pandya* render 21[c] obvious. EX1003, ¶243. As detailed above, *Thomas*’s first control differs from *Thomas*’s second control.

EX1003, ¶244. *Sewall*'s first control also differs from *Sewall*'s second control.

EX1003, ¶245. *Pandya*'s first control (e.g., bandwidth allocation) also differs from *Pandya*'s second control (e.g., traffic queue controls). EX1009, ¶¶62, 64, 77; EX1003, ¶246.

Accordingly, claim 21 as a whole would have been obvious.

**F. Ground 6: Claims 22-25 Are Obvious over *Thomas* and *Sewall* in View of *Sewall* '327**

**1. Motivation to Combine *Thomas*, *Sewall*, and *Sewall* '327 with a Reasonable Expectation of Success**

As detailed above, *Thomas* and *Sewall* are analogous art to the '102 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* §VI.B.1; EX1003, ¶247. These references disclose end-user devices used for setting up forwarding services, which can involve metering and tracking usage of a forwarding service to, e.g., manage costs under a service plan or provide incentives to a forwarding-service provider.

EX1005, ¶¶54-55, 76-77, Figs. 9, 10.

*Sewall* '327 is also analogous art and in the same field of endeavor as the '102 patent. *Sewall* '327 is directed to a network environment including a router that "rout[es] network communications between clients 12, 14, and 16 and internet 26." EX1010, ¶8. *Sewall* '327 further discloses "collect[ing] individualized usage

information from multiple users accessing the Internet via a single data plan.”

EX1010, ¶7, 31.

A skilled artisan would have been motivated to combine *Sewall* '327's disclosure with *Sewall* and *Thomas*. Indeed, *Sewall* '327 incorporates *Sewall*'s disclosure by reference. EX1010, ¶1 (incorporating 11/673,956). Moreover, *Thomas* and *Sewall* disclose end-user devices that can provide hotspot connections to multiple other user devices simultaneously. EX1005, ¶9; EX1006, ¶34. A skilled artisan would reasonably seek to collect individualized usage information for each of the users accessing the network through the end-user device's forwarding service to track usage costs and provide incentives on an individual user-by-user basis, improving monetization of the forwarding service. Combining these disclosures would have been within a POSITA's skill and would predictably apply known techniques (e.g., monitoring individual usage by a plurality of client devices) to known mobile-hotspot services. It would have been compatible and conventional to use individualized monitoring to track usage of specific users of a forwarding service provided through an end-user device. EX1003, ¶248.

**2. Claim 22: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to account for usage of the forwarding service.”**

Claim 22 depends from claim 1, which would have been obvious. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶250. *Thomas*, *Sewall*, and *Sewall* '327 render claim

22 obvious. EX1003, ¶250. *Thomas* discloses metering usage based on time of a connection, packets sent/received, or other factors. EX1005, ¶54. *Sewall* also discloses user data that includes “a table having a series of records, one for the owner and one for each authorized user.” EX1006, ¶38 (“[e]ach record may also contain usage data . . . for a particular user”).

To the extent Patent Owner disputes that *Thomas* and *Sewall* disclose the additional features of claim 22, *Sewall* ’327 further discloses that “a data service provider [can] collect individualized usage information from multiple users accessing the internet via a single data plan.” EX1010, ¶38; EX1003, ¶251. According to *Sewall* ’327, “a collection of statistics reflecting, for each client, the characteristics monitored by analyzer 40” may be provided, and these statistics can “be reflective of the amount or quantity of data routed with respect that client and with respect to each port number opened by that client.” EX1010, ¶23.

Accordingly, claim 22 as a whole would have been obvious. EX1003, ¶252; *supra* §VI.F.1.

**3. Claim 23: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to determine a separate accounting for usage of the forwarding service.”**

Claim 23 depends from claim 1, which would have been obvious. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶253. *Thomas*, *Sewall*, and *Sewall* ’327 render claim

23 obvious. EX1003, ¶253. *Thomas* and *Sewall* disclose end-user devices that can provide hotspot connections to multiple other user devices simultaneously.

EX1005, ¶9; EX1006, ¶34. *Thomas* discloses metering usage based on time of a connection, packets sent/received, or other factors. EX1005, ¶54. *Sewall* also discloses user data that includes “a table having a series of records, one for the owner and one for each authorized user.” EX1006, ¶38.

To the extent Patent Owner disputes that *Thomas* and *Sewall* disclose the additional features of claim 23, *Sewall* '327 discloses determining a separate accounting of each individual user's usage of a forwarding service for the same reasons discussed above regarding claim 21. *See, e.g.*, EX1010, ¶¶38, 23; EX1003, ¶254.

Accordingly, the subject matter of claim 23 as a whole would have been obvious. EX1003, ¶255; *supra* §VI.E.1.

**4. Claim 24: “wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to determine a separate accounting for usage of the forwarding service by a subset of one or more devices of the one or more other devices.”**

Claim 24 depends from claim 1, which would have been obvious. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶256. *Thomas*, *Sewall*, and *Sewall* '327 render claim 24 obvious, as these references render obvious determining a separate accounting for usage for any one or more individual device(s) for the same reasons addressed

above regarding claim 23. EX1003, ¶¶256-258. Moreover, the claim encompasses determining a separate accounting for as little as “one” device for its usage of the forwarding service.

## 5. Claim 25

Claim 25 depends from claim 1, which would have been obvious as discussed above. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶259.

**a. 25[a]: “obtain first information associated with usage of the wireless access network associated with traffic communicated between the end-user device and the network system or”**

*Thomas, Sewall, and Sewall* '327 render 25[a] obvious. EX1003, ¶260.

*Sewall* discloses user data that “may be a table having a series of records, *one for the owner* and one for each authorized user.” EX1006, ¶38 (emphasis added).

*Thomas* discloses obtaining and displaying information associated with the wireless device 110’s traffic with the network system. EX1005, ¶¶76-77, Figs. 9, 10; *see also* EX1010, ¶¶38, 26.

**b. 25[b]: “second information associated with usage of the wireless access network associated with forwarding service traffic between at least one of the one or more other devices and the network system.”**

*Thomas, Sewall, and Sewall* '327 render 25[b] obvious. EX1003, ¶261.

*Thomas* discloses that the “metered use of time and/or data passing through the wireless device 110” between client computing device 114 and internet 104 may

be monitored as part of an incentive plan. EX1005, ¶55. *Sewall* also discloses user data that “may be a table having a series of records, one for the owner *and one for each authorized user*.” EX1006, ¶38 (emphasis added). Further, *Sewall* discloses that a “user's session with personal hotspot 10 is monitored . . . [and] user data 58 for the particular user may be present in configuration data 42.” EX1006, ¶¶55-56.

To the extent Patent Owner disputes that *Thomas* and *Sewall* disclose the additional features of claim 22, *Sewall* '327 discloses that “a data service provider [can] collect individualized usage information from multiple users accessing the internet via a single data plan.” EX1010, ¶38; EX1003, ¶262. According to *Sewall* '327, “a collection of statistics reflecting, for each client, the characteristics monitored by analyzer 40” may be provided, and these statistics can “be reflective of the amount or quantity of data routed with respect that client and with respect to each port number opened by that client.” EX1010, ¶¶23, 26.

Accordingly, claim 25 as a whole would have been obvious. EX1003, ¶263.

**G. Ground 7: Claims 26-28 Are Obvious over *Thomas* and *Sewall* in View of *Trossen***

**1. Motivation to Combine *Thomas*, *Sewall*, and *Trossen* with a Reasonable Expectation of Success**

As detailed above, *Thomas* and *Sewall* are analogous art to the '102 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* §VI.B.1; EX1003, ¶264. These references

disclose providing a forwarding service to end-user devices and provisions for associating financial considerations with this service. EX1005, ¶¶54-55; EX1006, ¶¶25, 53.

*Trossen* is also analogous art and in the same field of endeavor as the '102 patent. EX1003, ¶265. *Trossen* is directed to managing access to wireless networks with mobile wireless clients. EX1011, ¶14. Furthermore, *Trossen* is also directed to associating costs with accessing the network. EX1011, ¶¶28-32. *Trossen* discloses a system in which the cost for using the network bridging service is provided to the user of the service, negotiated via user input, and used to determine provisioning of the service. EX1011, ¶¶28-32. *Trossen* further discloses that providing the requested service is based on an agreed-upon cost. EX1011, ¶¶32-34.

A skilled artisan would have been motivated to share information related to the cost to the users receiving access to the network, as *Trossen*, *Thomas*, and *Sewall* collectively disclose. EX1003, ¶266. A skilled artisan would also reasonably seek to utilize user input to obtain cost information, including as a way to control forwarding-service usage, as *Trossen* also discloses. Combining these disclosures was within a POSITA's skill and would predictably apply known techniques (e.g. providing service costs, obtaining service costs based on user input, and using cost as a means for control) to known mobile device-driven wireless network forwarding services that require payment, thereby informing

users on the costs associated with the service they wish or plan to utilize. EX1003, ¶264.

**2. Claim 26: “wherein the wireless access network is associated with a cost, and wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to provide information associated with the cost to at least one of the one or more other devices.”**

Claim 26 depends from claim 1, which would have been obvious as discussed above. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶267. *Thomas, Sewall*, and *Trossen* render claim 26 obvious. EX1003, ¶267. *Thomas* and *Sewall* disclose end-user devices that provide a forwarding service to connect computing devices to a wireless access network while disclosing costs associated with accessing that network. EX1005, Abstract, ¶¶54, 76-77; EX1006, Abstract, ¶53; EX1003, ¶265. *Trossen* discloses determining usage costs and sending a response back to a requesting user device. EX1011, ¶29. A skilled artisan would reasonably seek to improve the forwarding-service device of *Thomas* and *Sewall* by implementing *Trossen*’s features as detailed above. *Supra* §VI.G.1.

Accordingly, claim 26 as a whole would have been obvious. EX1003, ¶268.

**3. Claim 27: “wherein the wireless access network is associated with a cost, and wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to at least assist to control usage of the forwarding service based on the cost.”**

Claim 27 depends from claim 1, which would have been obvious as discussed above. *Supra* §§VI.A.1, VI.B.2; EX1003, ¶269. *Thomas*, *Sewall*, and *Trossen* render claim 26 obvious. EX1003, ¶269. *Thomas* and *Sewall* disclose a cost associated with a wireless access network and utilizing a service to connect to a network. EX1005, ¶54; EX1006, ¶53. Furthermore, *Sewall* discloses controlling forwarding-service usage by first requiring a user to provide payment information. EX1006, ¶¶53-56. *Trossen* additionally discloses allowing or rejecting access to the forwarding service based on a cost agreed upon by the end users on either end of the service. EX1011, ¶¶29-32. A skilled artisan would have been motivated to control usage based on cost, improving the forwarding-service device of *Thomas* and *Sewall* by implementing *Trossen*’s features, as detailed above. *Supra* §VI.G.1.

Accordingly, claim 27 as a whole would have been obvious. EX1003, ¶270.

**4. Claim 28: “wherein the wireless access network is associated with a cost, and wherein, when executed by the one or more processors, the one or more instructions further cause the one or more processors to obtain the cost based on a user input.”**

Claim 28 depends from claim 1, which would have been obvious as discussed above. *Supra* §§VI.A.1, VI.B.2. *Thomas*, *Sewall*, and *Trossen* render

claim 28 obvious. EX1003, ¶271. *Thomas* and *Sewall* disclose costs associated with a wireless access network. EX1005, ¶54; EX1006, ¶¶12, 22. *Trossen* discloses a process of arriving at a cost that is driven by a series of user inputs. EX1011, ¶¶27-32. A skilled artisan would have been motivated to obtain cost information based on a user input, which would allow for the owner of an end-user device to negotiate or decide whether to accept payment(s) from other computing devices seeking to use a forwarding service. *Supra* §VI.G.1; EX1003, ¶271.

Accordingly, claim 28 as a whole would have been obvious. EX1003, ¶272.

## **VII. Mandatory Notices**

### **A. Real Parties-in-Interest**

Google LLC<sup>2</sup> and Apple Inc. are the real parties-in-interest.

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<sup>2</sup> Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties-in-interest to this proceeding.

## B. Related Matters

The '102 patent is or has been involved in the following proceedings:

| Name                                                                                   | Number        | Forum     | Filed         |
|----------------------------------------------------------------------------------------|---------------|-----------|---------------|
| <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. | Sug. 27, 2025 |
| <i>Headwater Research LLC v. AT&amp;T Inc. et al</i>                                   | 2:25-cv-00428 | E.D. Tex. | Apr. 23, 2025 |
| <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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| Lead Counsel | Back-Up Counsel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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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 '102 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 1-30. The Office may charge any required fees to Deposit Account No. 06-0916.

Date: October 31, 2025

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 this 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 13,872 words.

Date: October 31, 2025

Respectfully submitted,

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

**CERTIFICATE OF SERVICE**

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), the undersigned certifies that on October 31, 2025, a copy of the foregoing Petition for *Inter Partes* Review, the associated power of attorney, and Exhibits 1001-1015 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. 8,631,102:

Headwater Research LLC  
c/o Farjami & Farjami LLP  
26522 La Alameda Ave., Suite 360  
Mission Viejo, CA 92691

Date: October 31, 2025

By: /Lisa C. Hines/  
Lisa C. Hines  
Case Manager  
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