

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,

Petitioner,

v.

HEADWATER RESEARCH LLC,

Patent Owner.

Patent No. 8,799,451
Case No. IPR2026-00466

PETITION FOR *INTER PARTES* REVIEW

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LIST OF EXHIBITS

<u>Exhibit</u>	<u>Description</u>
EX1001	U.S. Patent No. 8,799,451 to Raleigh (“the ’451 patent”).
EX1002	Prosecution History of U.S. Patent No. 8,799,451.
EX1003	Declaration of Bill Lin, Ph.D.
EX1004	Curriculum Vitae of Bill Lin, Ph.D.
EX1005	U.S. Patent Appl. Publ. No. 2009/0017789 to Thomas et al. (“ <i>Thomas</i> ”).
EX1006	U.S. Patent Appl. Publ. No. 2008/0039102 to Sewall et al. (“ <i>Sewall</i> ”).
EX1007	Reserved
EX1008	Reserved
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	Reserved
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 Publication</i> ”).
EX1015	U.S. Patent Appl. Publ. No. 2007/0104169 to Polson (“ <i>Polson</i> ”).
EX1016	Reserved

<u>Exhibit</u>	<u>Description</u>
EX1017	Reserved
EX1018	Reserved
EX1019	Reserved
EX1020	U.S. Patent No. 9,398,453 to Krishnaswamy et al. (“ <i>Krishnaswamy</i> ”).
EX1021	U.S. Patent Publication No. 2003/0088671 to Klinker et al. (“ <i>Klinker</i> ”).
EX1022	Reserved
EX1023	Reserved
EX1024	Reserved
EX1025	<i>Headwater Research LLC v. Google LLC</i> , C.A. No. 7:25-cv-00376, Joint Claim Construction Statement, ECF No. 78 (W.D. Tex., June 5, 2026) (transferred to the Northern District of California as case number 3:26-cv-06230).

I. Introduction

Petitioner Google LLC respectfully requests *inter partes* review of claims 1-9, 11-16, 20, 22-28, 33, 36, 43-44, 50, and 52-69 of U.S. Patent No. 8,799,451.

The '451 patent claims an end-user device capable of operating as an intermediate-networking device that communicates with a network system (e.g., the internet) over a wireless access network and provides a “forwarding service” to other devices (e.g., laptops), permitting them to communicate with the network system. The claimed end-user device also stores policy settings to authorize and provision 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 such mobile-hotspot technology was old and “conventional.” EX1005, ¶[0028]. During prosecution, however, Patent Owner represented otherwise. Patent Owner, despite being aware of invalidating prior art (e.g., *Sewall* (EX1006)), did not seek to distinguish *Sewall* and instead buried it among over eight hundred references.

Patent Owner’s actions led to clear examiner error. *Sewall* in fact discloses every limitation of claim 1, rendering it obvious. The other claims recite 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 obvious based on *Sewall* alone or with *Thomas, Polson, Krishnaswamy*, and/or *Pandya*.

As demonstrated in the grounds below, there is a reasonable likelihood that at least one claim—and indeed all challenged claims—of the '451 patent are unpatentable. Petitioner therefore respectfully requests that the Board institute *inter partes* review and cancel all claims of the '451 patent.

II. Technology Background

The following discussion of the state of the prior art is based on testimony from Dr. Lin, a Professor of Electrical and Computer Engineering and the Associate Dean for Research at the University of California, San Diego (UCSD). EX1003, ¶¶8-17.

1. Overview of *Sewall*

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

2. Overview of *Thomas*

Thomas discloses a wireless device capable of providing internet access to one or more other computing devices. EX1005, Abstract, ¶25. *Thomas*'s wireless device connects to the internet via, e.g., any cellular data network technology, and connects to other computing devices via a WLAN. *Id.*, ¶¶25, 32. The device has a display that provides notifications and that the user may interact with to, e.g., grant internet access to computing devices. *Id.*, ¶¶34, 46, 76; EX1003, ¶¶49-51.

3. Overview of *Polson*

Polson discloses a gateway adapted to establish a connection with a WWAN via an interface adapted to transfer data to and from the WWAN on behalf of LAN devices. EX1015, Abstract. *Polson* further discloses strategies for managing WWAN access, including adapting its gateway to prioritize specific data to manage conflicts between end-user devices. EX1015, ¶46. *Polson* recognizes that the ability to connect to multiple WWANs is necessary when one WWAN is unavailable due to user location, service provider issues, or service agreement features. EX1015, ¶¶52-53. *Polson*'s gateway thus includes a socket adapted to removably receive one or more WWAN interfaces (e.g., a PC Card) adapted to send and receive data through one or more WWANs. EX1015, ¶¶20, 51; EX1003, ¶¶52-53.

4. Overview of *Krishnaswamy*

Krishnaswamy discloses an ad hoc service provider for a wireless network including a processing system configured to support (1) a first wireless access protocol and (2) a wireless access point for one or more mobile clients using a second wireless access protocol. EX1020, Abstract, 1:47-52. The ad hoc service provider includes a service provider application that maintains a session with the server over the network and controls monitoring of the amount of content to and from the mobile clients as well as WWAN and WLAN resource utilization. *Id.*, 6:62-64, 7:1-12, Figs. 1-2. *Krishnaswamy* further discloses altering its ad hoc service provider's service in response to a resource-related event—e.g., when an available bandwidth is below a threshold. *Id.*, 10:51-54, 11:3-44; EX1003, ¶¶54-55.

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 may function as control points to manage network resources for other agent devices (e.g., computers). EX1009, ¶¶28, 44. *Pandya*'s control-point devices may monitor network events and congestion and provide a traffic-control mechanism to dynamically allocate bandwidth within the network. EX1009, ¶¶28, 77; EX1003, ¶56.

III. The '451 Patent

A. Overview

The '451 patent discloses a system that allows an end-user device to be used as an intermediate networking device. EX1001, 32:34-44, 35:21-30. Figure 15 reflects the purported invention:

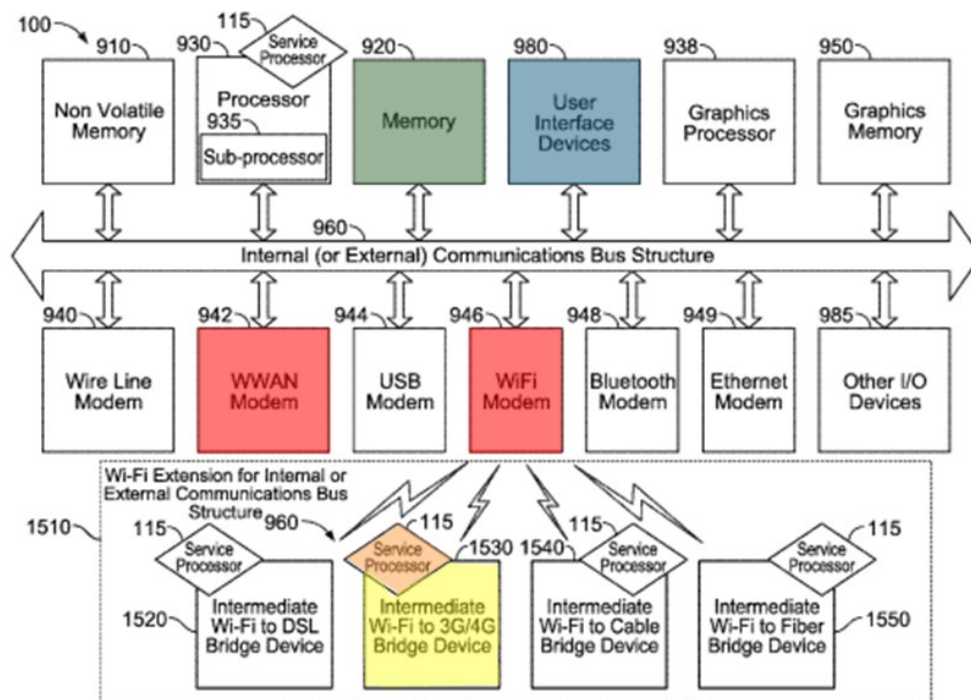


FIG. 15A

EX1001, Fig. 15A (annotated); EX1003, ¶¶42-43.

B. Prosecution History

The '451 patent issued after tortuous prosecution involving misrepresentations about prior art, a change of Examiners, improper amendments

reincorporating subject matter restricted early in prosecution, and the burying of problematic prior art references among massive IDS filings. EX1003, ¶¶44-47.

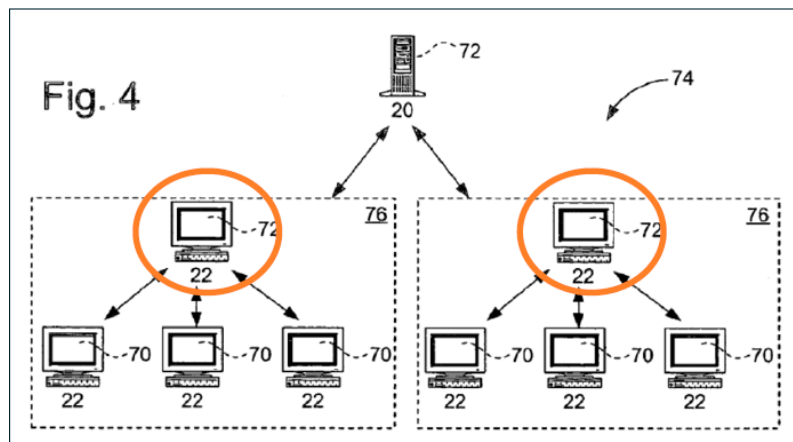
The original claims recited only an “intermediate networking device” acting as an intermediary between devices and a network. EX1002, 242. The Examiner rejected the claims as anticipated by routers disclosed in the prior art. EX1002, 1501 (citing *Klinker*, EX1021), 508 (obviousness rejection based on *Klinker* and *Pandya*).

Patent Owner did not dispute the router-based-anticipation rejection. Instead, Patent Owner amended the claims to recite, *inter alia*, a “first end user device capable of operating” as an intermediate networking device and asserted that the prior art did not disclose such a device. EX1002, 10, 24-25. Patent Owner also amended the claims to require providing a “forwarding service.” *Id.* In view of the extensive amendments, the Examiner issued a final office action withdrawing all claims because they were directed to subject matter distinct from the originally presented claims. EX1002, 56 (“Election by Original Presentation”) (citing 37 C.F.R. §1.145).

Patent Owner filed an RCE, canceled all claims, and represented that their subject matter would be pursued in continuations or divisionals. EX1002, 67. Contrary to that representation, however, Patent Owner later presented new claims again expressly reciting a “first end-user device capable of operating as an

intermediate networking device.” *Id.* While Patent Owner acknowledged that the new claims had some “amendments” compared to the original claims, Patent Owner asserted that the “amendments do not meaningfully alter the focus of the amended claims, and thus maintain the claims within the scope of the invention elected by original presentation”—i.e., the same claimed invention undisputedly anticipated by disclosure of a router. EX1002, 67, 69.

Patent Owner’s arguments contesting the prior art’s disclosure of the amended claims, however, contradicted those representations about claim scope. Patent Owner expressly relied on the new features of the claims to assert distinctions for patentability, arguing again that *Klinker* and *Pandya* do not disclose an end-user device capable of operating as an intermediate networking device. EX1002, 70. Notably, however, Patent Owner nowhere addressed *Pandya*’s disclosures and Figure 4 depicting such an intermediate networking device:



EX1009, Fig. 4 (annotated), ¶44 (disclosing that intermediate “control point” device 72 on a network may be a cellular phone, palm computer, pager, or any other end-user device).

A new Examiner assigned to the case failed to reissue rejections based on *Pandya* and *Klinker* or withdraw the claims again based on Patent Owner’s second attempt to claim beyond the originally presented subject matter. Instead, the new Examiner accepted Patent Owner’s representations regarding the new claims at face value, issuing a weak anticipation rejection based on *Robinson*. EX1002, 327.

The new Examiner’s failure to cite stronger prior art, such as *Sewall*, is understandable. Patent Owner buried *Sewall* and other strong prior art references in an IDS listing over 100 other references. EX1002, 480. In total, Patent Owner submitted 860 total references in IDSes—a problematic practice that the Office has recognized hinders adequate examination—and, unsurprisingly, the Examiners failed to cite any of those references in rejections. *See* 89 Fed. Reg. 91924 (recognizing that large IDSes are “onerous for examiners” and hinder evaluation of the prior art).

Patent Owner overcame the *Robinson*-based anticipation rejection. But in taking advantage of the Examiner change, Patent Owner trampled the Office’s previous requirement holding Patent Owner to its originally presented subject matter: Patent Owner again presented extensive amendments (including fifty-four

new claims) that should have resulted in another withdrawal of the claims.

EX1002, 663-685; 37 C.F.R. §1.145. The Examiner instead erroneously issued a notice of allowance lacking any reasoning. EX1002, 837.

IV. Level of Ordinary Skill

A person of ordinary skill in the art (“POSITA”) at the ’451 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, ¶¶57-58. More related education would 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, ¶¶59-60. Petitioner reserves the right to respond to any claim-construction arguments raised by Patent Owner.

VI. Statement of Precise Relief Requested

Petitioner requests review under 35 U.S.C. § 311 of claims 1-9, 11-16, 20, 22-28, 33, 36, 43-44, 50, and 52-69 of the ’451 patent and cancellation of those claims based on the following grounds.

	References	Basis	Challenged Claims
1	<i>Sewall</i>	§ 103	Claims 1, 2, 6, 12-15, 24, and 27
2	<i>Sewall and Thomas</i>	§ 103	Claims 3-5, 7-9, 11, 16, 22, 26, 36, 52-65, and 69
3	<i>Sewall and Polson</i>	§ 103	Claims 20 and 23
4	<i>Sewall and Krishnaswamy</i>	§ 103	Claims 33, 43, and 44
5	<i>Sewall, Krishnaswamy, and Pandya</i>	§ 103	Claims 25 and 28
6	<i>Sewall, Thomas, and Pandya</i>	§ 103	Claims 50 and 67
7	<i>Sewall, Thomas, and Polson</i>	§ 103	Claims 66 and 68

All asserted references qualify as prior art under pre-AIA 35 U.S.C.

§ 102(a), (b), and/or (e) based on the '451 patent's earliest possible priority date (January 28, 2009):

EX1005 § 102(a), (e)	U.S. Patent Publication 2009/0017789 (" <i>Thomas</i> "), filed January 22, 2008, published January 15, 2009.
EX1006 § 102(a), (e)	U.S. Patent Publication 2008/0039102 (" <i>Sewall</i> "), filed Feb. 12, 2007, published February 14, 2008.

EX1009 § 102(a), (b), (e)	U.S. Patent Publication 2004/0103193 (“ <i>Pandya</i> ”), filed November 7, 2003, published May 27, 2004.
EX1015 § 102(b)	U.S. Patent Publication No. 2007/0104169 to Polson (“ <i>Polson</i> ”), filed November 10, 2006, published May 10, 2007.
EX1020 § 102(e)	U.S. Patent No. 9,398,453 (“ <i>Krishnaswamy</i> ”), filed September 26, 2007.

A. Ground 1: Claims 1, 2, 6, 12-15, 24, and 27 Are Obvious over *Sewall*

1. Claim 1

Claim 1 would have been obvious over *Sewall*, which discloses all elements of claim 1.

a. 1[pre]: “A **first end-user device capable of operating as an intermediate networking device, the first end-user device comprising:”**

Sewall discloses 1[pre]. EX1003, ¶¶62-63. It discloses a data exchanger 20 and personal hotspot 10 that may be incorporated into the same device, such as an internet-enabled cellular telephone (“mobile hotspot”), that routes network communications between client devices 12, 14, and 16 and the internet 26. EX1006, ¶¶7, 9, 16, Figs. 1-2. *Sewall*’s mobile hotspot is thus a **first end-user device** capable of operating as an intermediate networking device. *Id.*

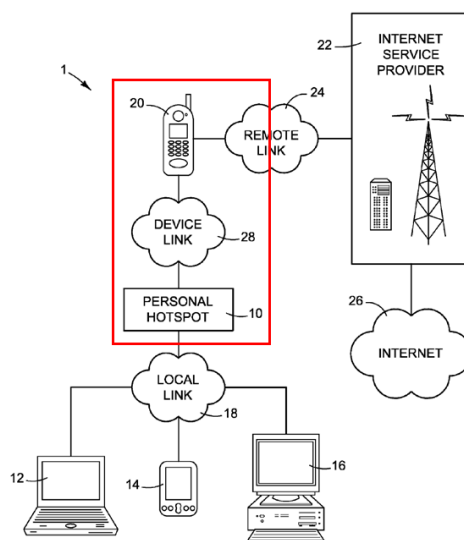


FIG. 1

b. 1[a]: “one or more modems enabling the first end-user device to communicate with a **network system** over a **first network** and with one or more other end-user devices over a **second network**, the first network comprising a wireless access network;”

Sewall discloses 1[a]. EX1003, ¶¶64-67. Like all mobile hotspots, *Sewall*'s mobile hotspot includes a modem for communicating with the internet (**network system**) via wireless remote link 24 (**first network**) and for communicating with the client devices 12, 14, and 16 (other end-user devices) via local link 18 (**second network**). EX1006, ¶¶7, 10, 13 (explaining remote link 24 may be wireless), 17.

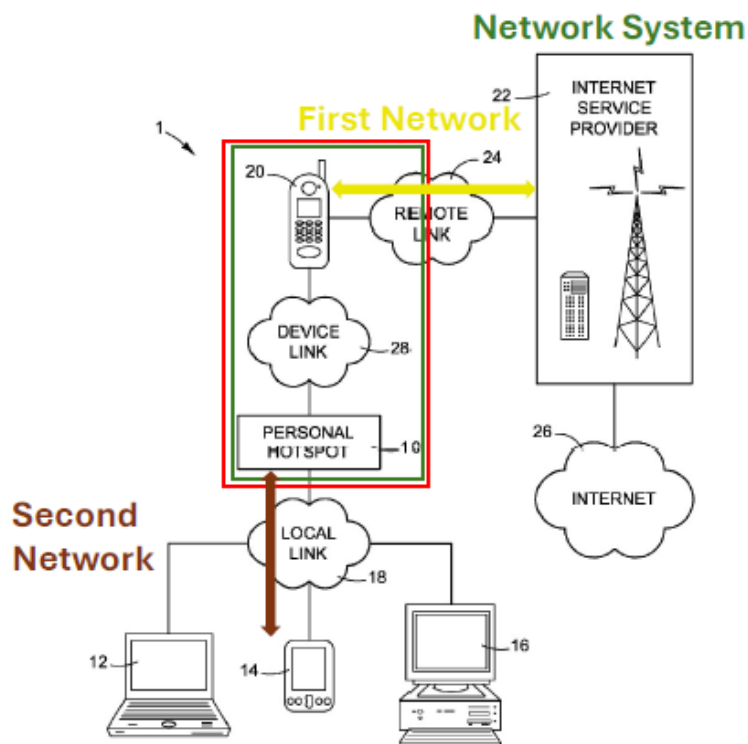


FIG. 1

Indeed, *Sewall* expressly discloses its personal hotspot may be any combination of hardware and/or programming capable of functioning as a router for directing network communications between client devices and the internet via a data exchanger such as a data capable cellular device, DSL modem, or cable modem. *Id.*, ¶17.

c. 1[b]: “at least one processor configured to execute one or more instructions that, when executed by the at least one processor, cause the at least one processor to:”

Sewall discloses 1[b]. EX1003, ¶¶68-69. Like all mobile hotspots, *Sewall*’s mobile hotspot includes a processor configured to execute one or more instructions. EX1006, ¶¶7, 58. Indeed, *Sewall* expressly discloses that the hotspot may be embodied in any computer-readable media for use by or in connection with an instruction execution system such as a computer/processor-based system or other system that can fetch or obtain the logic from computer-readable media and execute instructions contained therein. *Id.*, ¶58.

d. 1[b][i]: “provide a forwarding service to the one or more other end-user devices, the forwarding service for forwarding first traffic between the one or more other end-user devices and the network system,”

Sewall discloses 1[b][i]. EX1003, ¶¶70-71. Communication between client devices and the internet in *Sewall* depends on the forwarding service provided by the mobile hotspot. EX1006, ¶15, Figs. 1-2. As shown in Figure 1, the mobile

hotspot (data exchanger 20 and personal hotspot 10) forwards **first traffic** between client devices 12, 14, and 16 (“the one or more other end-user devices”) and the internet 26 via local link 18 and remote link 24. *Id.*, Fig. 1.

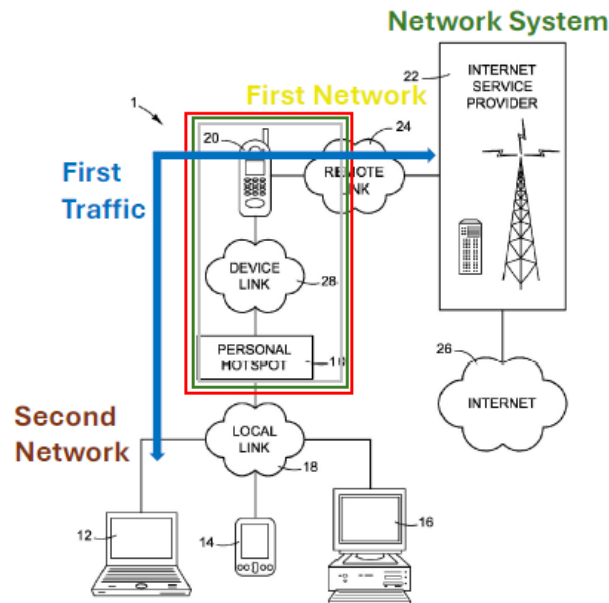


FIG. 1

e. 1[b][ii]: “implement a **first service policy**, the first service policy for assisting in control of the first traffic,”

Sewall discloses 1[b][ii]. EX1003, ¶¶72-78. As explained above, *Sewall*’s mobile hotspot combines the data exchanger 20 and personal hotspot 10. EX1006, ¶16. The personal hotspot contains a limiter 40 (*id.*, Fig. 3, ¶19), which includes configuration data 42. *Id.*, Fig. 4, ¶23. The configuration data 42 includes default profiles 54 (*id.*, Fig. 5, ¶33), including a device profile 60, owner profile 62, authorized user profile 64, and anonymous user profile 66. *Id.*, ¶34.

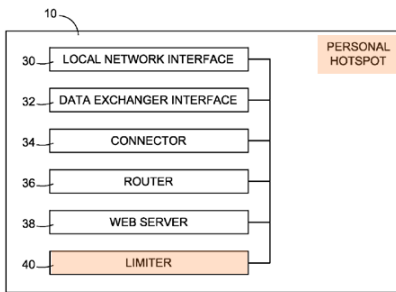


FIG. 3

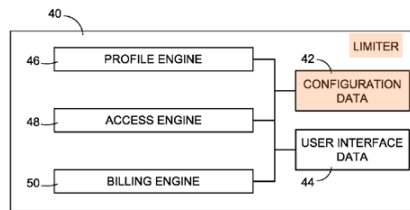


FIG. 4

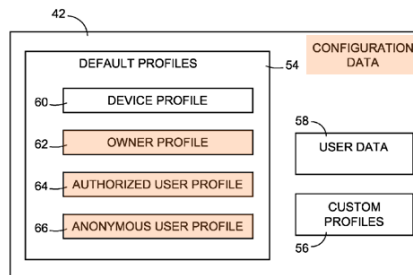


FIG. 5

To assist with controlling first traffic between client devices and the internet, *Sewall*'s mobile hotspot implements first access rules (**first service policy**) based on the owner 62, authorized user 64, and anonymous user 66 profiles. *Id.*, ¶36. The first access rules may impose upload and download bandwidth limits for each user or limit the amount of data transfer allowed by each user in a given period. *Id.* For example, *Sewall* explains that anonymous user access rules will typically be more

limiting than authorized user access rules, and authorized user access rules will be more limiting than owner access rules. *Id.*

f. 1[b][iii]: “implement a **second service policy**, the **second service policy** for assisting in control of **second traffic**, the **second traffic** associated with access by the first end-user device to one or more services over the first network, wherein the second service policy differs from the first service policy, and”

Sewall discloses 1[b][iii]. EX1003, ¶¶79-83. As explained above, *Sewall*’s mobile hotspot is configured with device, owner, authorized user, and anonymous user profiles. EX1006, ¶¶16, 19, 23, 33, 34, Figs. 3-5. To assist with controlling **second traffic** between the mobile hotspot and the internet via remote link 24, *Sewall*’s mobile hotspot implements second access rules (**second service policy**) based on the device profile 60. *Id.*, ¶34.

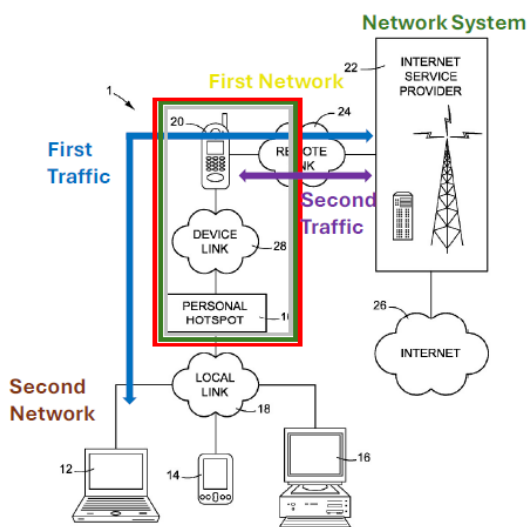


FIG. 1

In other words, whereas **first traffic** involves data that the hotspot forwards on behalf of the other devices, **second traffic** involves the hotspot's own network communication with the network system (over the first network). EX1003, ¶83. Thus, in contrast to the first access rules ("first service policy"), the second access rules involve device access rules applying to all users of the mobile hotspot. EX1006, ¶34. A POSITA would understand that the second access rules dictate the types of services (e.g., email, web browsing, multimedia) that are supported over the first network and available for the mobile hotspot itself as well as other connected devices. EX1003, ¶83. For example, the second access rules may specify upload and download bandwidth limits for the mobile hotspot, limiting the amount of data transfer allowed by the mobile hotspot in a given period, the number of simultaneous users or sessions supported by the mobile hotspot, etc. EX1006, ¶34. *Sewall* explains that the nature of second access rules may depend on the nature of the data subscription package that the owner of the mobile hotspot has with internet service provider 22; for example, a premium package may have less stringent limitations than a basic subscription package. *Id.*; *see also id.*, ¶¶43-44. The second access rules may also be customized or updated by the owner of the mobile hotspot. *Id.*, ¶25.

g. 1[b][iv]: “monitor or identify successful use or attempted use of the forwarding service; and”

Sewall discloses 1[b][iv]. EX1003, ¶¶84-86. When a communication is received from a client device attempting to use the mobile hotspot’s forwarding service, the access engine 48 of *Sewall*’s mobile hotspot parses configuration data 42, monitors the source of the communication from user data 58, and identifies a profile (e.g., owner, authorized user, or anonymous user) associated with the source of the communication. EX1006, ¶¶16, 47, 48, Figs. 4-5, 8.

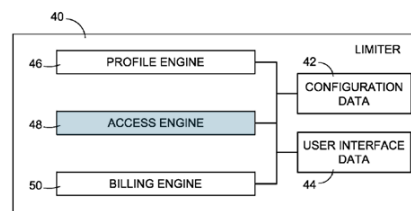


FIG. 4

From the identified profile, access engine 48 extrapolates the first access rules for the source of the communication and grants and/or limits access to the forwarding service according to those rules. *Id.*, ¶49, Fig. 8.

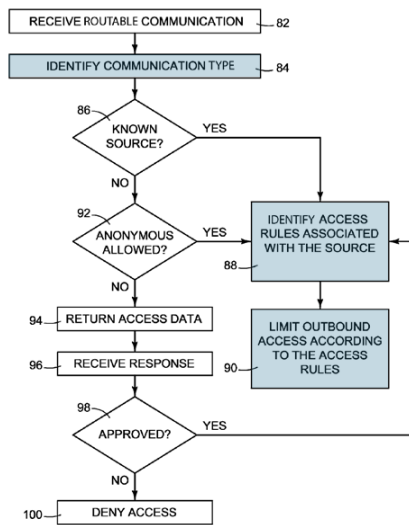


FIG. 8

As such, *Sewall*'s mobile hotspot identifies and monitors successful use (or attempted use) of the forwarding service. EX1003, ¶¶84-86.

h. 1[c]: “memory coupled to the at least one processor and configured to provide the at least one processor with the one or more instructions.”

Sewall discloses 1[c]. EX1003, ¶¶87-88. *Sewall*'s mobile hotspot includes a memory coupled to the processor and configured to provide the processor with instructions. EX1006, ¶7. Indeed, *Sewall* discloses its hotspot may be embodied in any computer-readable media for use by or in connection with an instruction execution system such as a computer/processor-based system or other system that can fetch or obtain the logic from computer-readable media and execute the instructions contained therein. *Id.*, ¶58. *Sewall* further provides examples of suitable computer-readable media including a portable magnetic computer diskette

such as floppy diskettes or hard drives, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory, or a portable compact disc. *Id.*

Accordingly, *Sewall* discloses all elements of claim 1, and claim 1 would have been obvious over *Sewall*.

2. Claim 2: “wherein the first service policy assists in controlling whether the first end-user device is authorized to provide the forwarding service to the one or more other end-user devices.”

Sewall discloses claim 2. EX1003, ¶¶89-91. To assist with controlling first traffic between client devices and the internet, *Sewall* implements first access rules for the owner 62, authorized user 64, and anonymous user 66 profiles. EX1006, ¶36. The first access rules may vary depending on the user profile and control whether *Sewall*’s mobile hotspot provides forwarding services to the different client devices seeking access. *Id.* For example, *Sewall*’s access rules may dictate that one or more other end-user devices using an anonymous user profile is blocked from access by the hotspot—i.e., not authorized to receive forwarding services. *Id.*

3. Claim 6: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to set a traffic speed.”

Sewall discloses claim 6. EX1003, ¶¶92-93. To assist with controlling traffic speed, *Sewall* implements access rules obtained from configuration data on the hotspot. *E.g.*, EX1006, ¶26. These access rules may, *inter alia*, limit bandwidth or the amount of data a particular user can download on a given end-user device during a given period, which a POSITA would understand as setting a traffic speed. *Id.*

4. Claim 12: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to modify a policy setting based on the monitored or identified successful use or attempted use of the forwarding service.”

Sewall discloses claim 12. EX1003, ¶¶94-95. For example, when a client device requests (and is granted) access, configuration data 42 is *updated* or *modified* on the mobile hotspot to include user data 58 associating the requesting end user with a default or custom profile. EX1006, ¶52. When the requesting client device becomes associated with a profile upon successful (or attempted) use of the forwarding service, *Sewall* discloses modifying its mobile hotspot policy settings to provide, limit, or deny access accordingly. *Id.*

5. Claim 13: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: obtain a service usage measurement providing an indication of usage of the forwarding service by the one or more other end-user devices.”

Sewall discloses claim 13. EX1003, ¶¶96-98. For example, *Sewall*’s mobile hotspot tracks user data 58, which may include a series of records “for the owner” and “for each authorized user.” EX1006, ¶38, Fig. 5. Each record may contain usage data and expiration data for a particular user, including “the amount of data uploaded or downloaded” by that user “in a particular time frame.” *Id.*

6. Claim 14

Claim 14 would have been obvious over *Sewall*, as *Sewall* discloses all elements of claim 14.

a. 14[pre]: “A computer program product embodied in a non-transitory computer readable storage medium and comprising computer instructions for causing one or more processors of a first end-user device to:”

Sewall discloses 14[pre]. EX1006, ¶¶7, 9, 16, Figs. 1-2; EX1003, ¶¶99-100; *supra* §VI.A.1.a. In particular, *Sewall* explains that disclosed embodiments may be embodied in a computer program stored on computer-readable media for execution by one or more processors. EX1006, ¶¶7, 9, 16, 57-58, Figs. 1-2. Indeed, *Sewall* expressly states “the present invention can be embodied in any computer-readable media for use by or in connection with an instruction execution system.” *Id.*, ¶58.

b. 14[a]: “provide a forwarding service to one or more other end-user devices communicatively coupled to the first end-user device over a first network, the forwarding service for forwarding first traffic between the one or more other end-user devices and a network system communicatively coupled to the first end-user device over a second network, the second network comprising a wireless access network;”

In claim 14, the networks labeled as the “first” and “second” networks are switched relative to claim 1. Specifically, claim 1 refers to the network over which the first end-user device communicates with a network system as the “first” network, whereas claim 14 refers to such a network as the “second” network. Likewise, whereas claim 1 refers to the network over which the first end-user device communicates with one or more other end-user devices as the “second” network, claim 14 refers to such a network as the “first” network. In both cases of terminology, *Sewall* discloses 14[a] for the reasons discussed regarding claim 1[a]-[b][i]. EX1006, ¶¶7, 10, 13, 15, 17, Figs. 1-2; EX1003, ¶¶101-102; *supra* §VI.A.1.b-d.

c. 14[b]: “implement a first service policy, the first service policy for assisting in control of the first traffic;”

Sewall discloses 14[b] for the reasons discussed regarding claim 1[b][ii]. EX1006, ¶¶16, 19, 23, 33, 34, 36, Figs. 3-5; EX1003, ¶103; *supra* §VI.A.1.e.

d. 14[c]: “implement a second service policy, the second service policy for assisting in control of second traffic, the second traffic associated with access by the first end-user device to one or more services over the second network, wherein the second service policy differs from the first service policy; and”

Sewall discloses 14[c] for the reasons discussed regarding claim 1[b][iii].

EX1006, ¶¶16, 19, 23, 33, 34, 36, 43-44, Figs. 3-5; EX1003, ¶104; *supra* §VI.A.1.f.

e. 14[d]: “monitor or identify successful use or attempted use of the forwarding service.”

Sewall discloses 14[d] for the reasons discussed regarding claim 1[b][iv].

EX1006, ¶¶16, 47-49, Figs. 4-5, 8; EX1003, ¶¶105-106; *see supra* §VI.A.1.g.

Accordingly, *Sewall* discloses all elements of claim 14, and claim 14 would have been obvious over *Sewall*.

7. Claim 15

a. 15[pre]: “A method performed by a first end-user device capable of operating as an intermediate networking device, the method comprising:”

Sewall discloses 15[pre] for the reasons discussed regarding claim 1[pre].

EX1006, ¶¶7, 9, 16, Figs. 1-2; EX1003, ¶¶107-108; *supra* §VI.A.1.a. Indeed, *Sewall* discloses an embodiment “directed to a method for limiting network communications” that “is implemented at a device through which communications can be routed between client devices and the internet.” EX1006, Abstract.

b. 15[a]: “providing a forwarding service to one or more other end-user devices communicatively coupled to the first end-user device over a first network, the forwarding service for forwarding first traffic between the one or more other end-user devices and a network system communicatively coupled to the first end-user device over a second network, the second network comprising a wireless access network;”

In claim 15—as in claim 14—the networks labeled as the “first” and “second” networks are switched relative to claim 1. In both cases of terminology, *Sewall* discloses 15[a] for the reasons discussed regarding claim 1[a]-[b][i].

EX1006, ¶¶7, 10, 13, 15, 17, Figs. 1-2; EX1003, ¶¶109-110; *supra* §VI.A.1.b-d.

c. 15[b]: “implementing a first service policy, the first service policy for assisting in control of the first traffic;”

Sewall discloses 15[b] for the reasons discussed regarding claim 1[b][ii].

EX1006, ¶¶16, 19, 23, 33, 34, 36, Figs. 3-5; EX1003, ¶111; *supra* §VI.A.1.e.

d. 15[c]: “implementing a second service policy, the second service policy for assisting in control of second traffic, the second traffic associated with access to the first end-user device to one or more services over the second network, wherein the second service policy differs from the first service policy; and;”

Sewall discloses 15[c] for the reasons discussed regarding claim 1[b][iii].

EX1006, ¶¶16, 19, 23, 33, 34, 36, 43-44, Figs. 3-5; EX1003, ¶112; *supra* §VI.A.1.f.

e. 15[d]: “monitoring or identifying successful use or attempted use of the forwarding service.”

Sewall discloses 15[d] for the reasons discussed regarding claim 1[b][iv].

EX1006, ¶¶16, 47-49, Figs. 4-5, 8; EX1003, ¶¶113-114; *supra* §VI.A.1.g.

Accordingly, *Sewall* discloses all elements of claim 15, and claim 15 would have been obvious over *Sewall*.

8. Claim 24: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify one or more network destinations for which the first end-user device is authorized to provide the forwarding service.”

Sewall discloses claim 24. EX1003, ¶¶115-117. For example, *Sewall*’s mobile hotspot includes configuration data 42 indicating that paid access is allowed. EX1006, ¶28, Fig. 4. Accordingly, when an anonymous user first attempts to access the internet via *Sewall*’s mobile hotspot, access engine 48 blocks communication except as to reaching a payment page. *Id.*, ¶¶28, 51. Thus, the mobile hotspot is only authorized to direct the anonymous user to the payment service on the internet until additional network destinations are authorized. EX1003, ¶117.

9. Claim 27: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: limit a number of the one or more other end-user devices authorized to use the forwarding service.”

Sewall discloses claim 27. EX1003, ¶¶118-119. *Sewall*’s device profile 60 provides access rules “limit[ing] the number of simultaneous users or sessions supported by [the mobile] hotspot.” EX1006, ¶34.

B. Ground 2: Claims 3-5, 7-9, 11, 16, 22, 26, 36, 52-65, and 69 Are Obvious over *Sewall* and *Thomas*

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

Sewall and *Thomas* are analogous art to the ’451 patent. EX1003, ¶120. They are in the same field of endeavor: mobile devices and wireless access points for computer networking. EX1006, ¶¶3, 7-8, 11, Figs. 1-9; EX1005, ¶¶2, 6, 9, 23, 28, 84-85, Figs. 1-11. They also share a common goal with the ’451 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including improving customizability and monetization of mobile-hotspot technology. EX1006, Abstr., ¶¶7-9, 17, 22, 25, 28-31; EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1001, 32:34-34:61, 65:31-67, 122:52-123:6, EX1003, ¶121.

A POSITA would have been motivated to combine *Sewall* and *Thomas* because they describe complementary features for controlling or limiting access to

personal-hotspot services. EX1003, ¶¶122-130. *Sewall* discloses configuring a mobile hotspot with a device profile and user profiles (e.g., owner, authorized user, anonymous user) that grant and/or limit access to the hotspot service. EX1006, ¶¶47-50. *Thomas* provides a user interface so users can identify and select other computing devices (e.g., laptops) to access the service. EX1003, ¶128; EX1005, ¶¶44-46, Figs. 5-6. Using *Thomas*'s user interface to make "on-the-fly" determinations would improve the flexibility and customizability of *Sewall*'s profile-based access configurations. EX1003, ¶129; EX1005, ¶¶29, 54-56, Figs. 5-6. A POSITA also would have recognized the benefits of implementing *Sewall*'s user profiles 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 a wireless device 110. EX1003, ¶129.

A POSITA also would have been motivated to combine *Sewall* and *Thomas* because they provide complementary billing and reward systems encouraging mobile-device users to provide hotspot services. EX1003, ¶¶126-127. *Sewall* describes a billing agent where other devices can directly compensate the hotspot owner. EX1006, ¶¶28-32. *Thomas* describes a wireless-carrier "reward" plan for sharing internet access. EX1005, ¶¶55-56. These complementary systems incentivize mobile users to provide hotspot services without being responsible for any increased data or bandwidth costs. EX1003, ¶127. Moreover, combining these

features increases flexibility and encourages extending hotspot services by compensating the mobile hotspot owners with payments from the wireless carrier and/or other hotspot users. *Id.*

Sewall and *Thomas* disclose several highly compatible features. EX1003, ¶¶122-130. Both references describe mobile hotspots for providing internet access to other computing devices. EX1006, ¶7, Figs. 1-2; EX1005, ¶¶2, 9, Figs. 5-6; EX1003, ¶123. Both references 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, ¶124. Both references also advantageously support using mobile devices' WLAN capabilities to provide hotspot services to a greater number of computing devices than previously possible using Bluetooth or infrared connections. EX1005, ¶¶27-28; EX1006, ¶¶14, 18; *see* EX1001, 33:41-64, Fig. 15A; EX1003, ¶125.

Accordingly, a POSITA would have been motivated to combine *Sewall* and *Thomas* 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., basic programming to implement

hotspot access controls, billing services, etc.) to known mobile devices to provide “conventional” hotspot services. EX1003, ¶130.

2. Claim 3: “wherein the first network comprises a 2G network, a 3G network, a 4G network, or a Wi-Fi network.”

Claim 3 depends from claim 1, which is obvious. *Supra* § VI.A.1. *Sewall* and *Thomas* render claim 3 obvious.

Sewall discloses that remote link 24 (first network) may be any combination of a cable, wireless, or remote connection to provide electronic communication between data exchanger 20 and service provider 22. EX1006, ¶13. *Sewall* also discloses its personal hotspot may be any combination of hardware and/or programming capable of functioning as a router for directing network communications between client devices and the internet, including “a data capable cellular device.” *Id.*, ¶17. Further, *Thomas* discloses its wireless device “may utilize any cellular data network technology (e.g., 2.5G, 3G, 4G, or any future technology).” EX1005, ¶32. As detailed above, and in view of *Thomas*’s express disclosure, a POSITA would have understood that the “data capable cellular device” of the *Sewall-Thomas* combination communicates with the internet via remote link 24 using a cellular data network, as claimed. EX1003, ¶¶131-133. Accordingly, claim 3 would have been obvious.

3. Claim 4: “wherein the second network comprises a Wi-Fi network, a Bluetooth network, a USB network, an Ethernet network, a FireWire network, or a near field communication network.”

Claim 4 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 4 obvious.

Sewall discloses that local link 18 (second network) represents a cable, wireless, or remote link via a telecommunication link, an infrared link, a radio frequency link, or any other connector or system that provides electronic communication between devices 10, 12, and 14 and personal hotspot 16. EX1006, ¶10. Further, *Sewall*’s personal hotspot includes a local network interface 30 that “may include a transceiver operable to exchange network communications utilizing a wireless protocol such as ultrawideband (UWB), Bluetooth, or 802.11 [i.e., Wi-Fi].” EX1006, ¶18.

Thomas also describes Bluetooth as a “conventional” means for a client computing device to communicate with a wireless hotspot. EX1005, ¶32. The wireless hotspot device in *Thomas* improves upon this “conventional” approach by allowing for client computing devices to communicate with it “using a Wi-Fi or other link,” thereby allowing client computing devices to “choose among different wireless devices 110 based upon available signal strength and bandwidth capacities.” EX1005, ¶32.

Sewall and *Thomas* thus disclose a second network, as claimed. EX1003, ¶¶134-138. Accordingly, claim 4 would have been obvious.

4. Claim 5: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify one or more network types over which the first end-user device is authorized to act as the intermediate networking device.”

Claim 5 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 5 obvious.

Sewall discloses a mobile hotspot that communicates with (i) the internet via remote link 24 and (ii) client devices 12, 14, and 16 via local link 18. EX1006, ¶¶7, 10, 13, 17. *Sewall*’s mobile hotspot acts as an intermediate networking device by connecting to a service provider, which provides internet-related data services. A POSITA would have understood from *Sewall* that the network type(s) over which its mobile hotspot is authorized to act as an intermediate networking device is dictated by the owner’s paid subscription plan with the service provider and, further, that *Sewall*’s mobile hotspot identifies such network(s) before providing a forwarding service. EX1003, ¶140; *see* EX1006, ¶25. Specifically, to function as intended, *Sewall*’s mobile hotspot establishes a data connection to the service provider and requests configuration data from the service provider, including access rules that apply to all user devices. EX1003, ¶140; *see* EX1006, ¶25.

To the extent Patent Owner argues *Sewall* does not explicitly describe a process by which its mobile hotspot identifies a particular type of cellular network over which it is authorized to act as an intermediate networking device, such a process would have been obvious in view of *Thomas*. For example, *Thomas* discloses its wireless device “may utilize any cellular data network technology (e.g., 2.5G, 3G, 4G, or any future technology)” to communicate with the internet and also that roaming may be included in the data plan coverage. EX1005, ¶¶32, 71. Each of these is a different network type. Moreover, Figure 7 of *Thomas* illustrates an exemplary message flow between the wireless device 110 and the server 108 to configure the wireless device 110 for operation and to authorize the client computing device 114 for operation. EX1005, ¶57, Fig. 7.

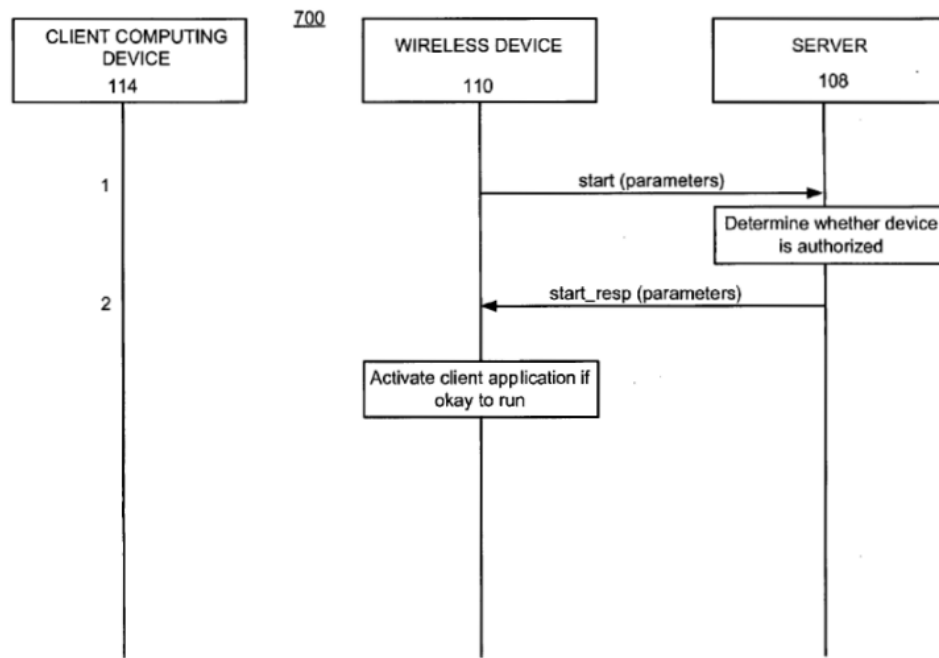


FIGURE 7

When the user of the wireless device 110 starts the client access application 312, a start message is sent from the wireless device 110 to the server 108 (line 1) that includes certain identifying parameters. *Id.*, ¶58. In response, “the server 108 determines whether the wireless device 110 is authorized to operate within the network”—including whether the network type (e.g., 2.5G, 3G, 4G, or roaming) is acceptable—and sends a start response message (line 2) indicating, *inter alia*, whether the wireless device 110 is authorized to use the server to provide a forwarding service. EX1005, ¶59 (“The start response message includes parameters such as . . . response (e.g., okay to run or never start”).

As detailed above, and in view of *Thomas*'s express disclosure, a POSITA would have understood that *Sewall*'s mobile hotspot (alone or in combination with *Thomas*) identifies one or more network types over which it is authorized to act as the intermediate networking device. *Supra* §VI.B.1; EX1003, ¶¶139-144.

Accordingly, claim 5 would have been obvious.

5. Claim 7: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to notify a user when the first end-user device is authorized to provide the forwarding service.”

Claim 7 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 7 obvious.

Sewall discloses a billing process by which users of client devices seeking to connect to the mobile hotspot are notified when the hotspot is authorized to provide the forwarding service. Specifically, *Sewall*'s mobile hotspot may require payment for access. EX1006, ¶53, FIG. 9. If so, the hotspot directs the user to a web page to provide payment information using the client device. EX1006, ¶53, FIG. 9. Once the payment information is verified, “personal hotspot 10 returns an ‘access granted’ response to the user (step 110).” *Id.*, ¶¶53-54. Thus, users of client devices seeking to connect to the mobile hotspot are notified when the hotspot is authorized to provide the forwarding service. *Id.*; EX1003, ¶¶146-147.

Additionally, as discussed above, *Thomas's* wireless device 110 receives a start response message (line 2) indicating, *inter alia*, whether it is authorized to use the server to provide a forwarding service. EX1005, ¶59. *Thomas's* wireless device 110 also has a user interface screen 900 providing connection information for the wireless device 110 and thus notifies the mobile-hotspot user whether the client device is authorized to provide the forwarding service. EX1005, ¶76, FIG. 9; EX1003, ¶¶148-149.

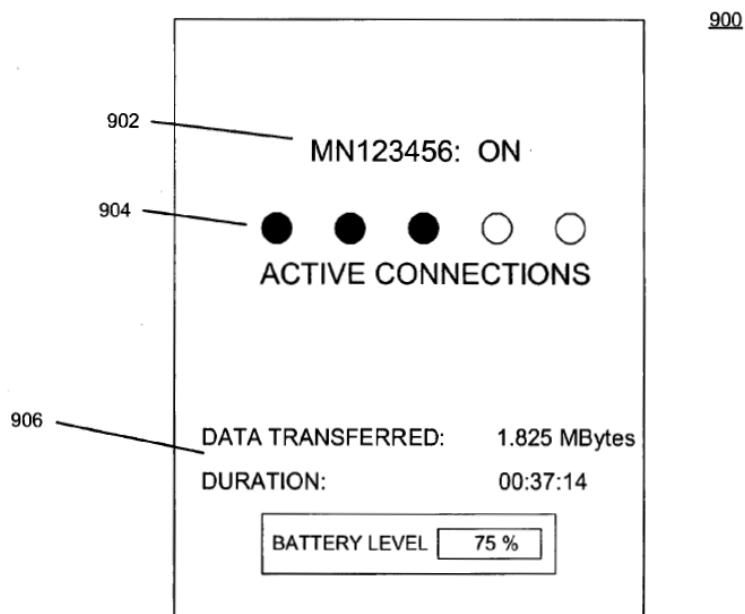


FIGURE 9

As detailed above, a POSITA would have been motivated to combine *Sewall's* notification to end users and *Thomas's* notification to the mobile-hotspot user to keep each informed of use of the forwarding service. This would enable (i)

the end user to promptly begin use of the service once authorized and (ii) the mobile-hotspot user to monitor use of the hotspot to ensure device access rules are not nearing their limits. EX1006, ¶34; EX1003, ¶¶145-151; *supra* §VI.B.1.

Accordingly, claim 7 would have been obvious.

6. Claim 8: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to notify a user whether the first end-user device is authorized to provide the forwarding service when the first network comprises a roaming network.”

Claim 8 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 8 obvious.

Thomas discloses security features for the wireless device 110, including “roaming awareness and management.” EX1005, ¶¶70-71. *Thomas* further discloses that a “roaming notification” may be presented on the user interface 1000. EX1005, ¶¶76-77. Thus, through the user interface screen 1000, the user of the wireless device 110 is notified of whether it is authorized to provide the forwarding service when the first network is a roaming network. EX1003, ¶¶152-155.

As detailed above, a POSITA would have been motivated to add *Thomas*’s roaming notification to *Sewall*’s mobile hotspot so the mobile-hotspot user would be informed when they exited their home network and entered a roaming network,

and know whether the mobile hotspot was authorized to provide the forwarding service via the roaming network. *Supra* §VI.B.1; EX1003, ¶156.

Accordingly, claim 8 would have been obvious.

7. Claim 9: “wherein the first service policy is based on whether the first network comprises a home network or a roaming network.”

Claim 9 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 9 obvious.

As discussed above, *Thomas* discloses its wireless hotspot device includes security features such as “roaming awareness and management.” EX1005, ¶70. *Thomas* further discloses that “data plans may be provided by which a user *may* include roaming within the plan coverage.” EX1005, ¶71 (emphasis added). As such, a POSITA would have understood from *Thomas* that not all users have data plans that include roaming coverage. EX1003, ¶158. Moreover, when a user’s plan does not include roaming, *Thomas*’s wireless hotspot device does not authorize forwarding service on a roaming network. *Id.*; EX1005, ¶71. *Thomas* thus discloses that the first service policy controlling traffic between the client computing device and the internet is based on whether the first network is a home network or a roaming network. EX1003, ¶158.

As detailed above, a POSITA would have been motivated to modify *Sewall*’s first access rules to account for whether the first network is a home or

roaming network as described in *Thomas* so that certain users with less restrictions, e.g., the owner, could continue use of the forwarding service over a roaming network while other users with more restrictions, e.g., anonymous users, could not. *Supra* §VI.B.1; EX1003, ¶¶157-159.

Accordingly, claim 9 would have been obvious.

8. Claim 11: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to notify a user when one of the one or more other end-user devices attempts to use or succeeds in using the forwarding service.”

Claim 11 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 11 obvious.

As discussed above, *Sewall*’s mobile hotspot requires payment for access to the internet. EX1006, ¶53, FIG. 9. Once the payment information is verified, “personal hotspot 10 returns an ‘access granted’ response to the user (step 110).” *Id.*, ¶¶53-54. Thus, end-users attempting to connect to *Sewall*’s mobile hotspot with their devices are notified when successful. *Id.*; EX1003, ¶161.

Thomas also discloses methods for programming wireless device 110 to authorize computer traffic. EX1005, ¶46. For example, *Thomas* discloses notifying users via display 314 about requests to use wireless device 110 for forwarding services, which the user of wireless device 110 may accept or deny. *Id.* Thus,

Thomas's wireless device user is also notified of attempted or successful uses of the forwarding service. EX1003, ¶¶162-163

As detailed above, a POSITA would have been motivated to combine *Sewall*'s notification to end users and *Thomas*'s notification to the mobile-hotspot user to keep each informed about use of the forwarding services. EX1003, ¶¶160-165; EX1006, ¶34; *supra* §VI.B.1.

Accordingly, claim 11 would have been obvious.

9. Claim 16: “wherein the first network comprises a cellular network and the second network comprises a Wi-Fi network.”

Claim 16 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 16 obvious for the reasons also discussed regarding claims 3 and 4. *Supra* §§VI.B.2, VI.B.3.

A POSITA would have been motivated in view of *Thomas*'s explicit disclosure to use a cellular network as the first network (remote link 24) in connection with *Sewall*'s “data capable cellular device.” EX1006, ¶17; EX1005, ¶32; EX1003, ¶¶166-167. A POSITA would have further been motivated in view of *Sewall*'s and *Thomas*'s disclosures to use a Wi-Fi network as the second network (local link 18) to capitalize on the mobility and convenience of allowing users to connect wirelessly from anywhere within range. EX1006, ¶17; EX1005, ¶32 (“[U]se of Wi-Fi . . . may allow greater redundancy than conventional

solutions of using a private Bluetooth link to a specific cellular device”);
EX1003, ¶168.

Accordingly, claim 16 would have been obvious.

10. Claim 22: “wherein the first service policy or the second service policy is based on a type of the first network or the second network.”

Claim 22 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 22 obvious.

As discussed above, *Sewall* discloses a first network that may be any combination of a cable, wireless, or remote connection to provide electronic communication between its personal hotspot and the service provider. EX1006, ¶13. *Sewall* further discloses a second service policy that specifies upload and download bandwidth limits over the first network. *Id.*, ¶26. *Thomas* discloses that such bandwidth limits may vary based on, e.g., the type of cellular data network. EX1005, ¶¶32, 83. Thus, a POSITA would have understood the *Sewall-Thomas* combination discloses a second service policy limiting bandwidth based on the first network. EX1003, ¶¶169-171; *Supra* §VI.B.1.

Additionally, *Sewall* discloses that a second network that may be any connector or system that provides for electronic communication, including “utilizing a wireless protocol such as . . . Bluetooth, or 802.11 [i.e., Wi-Fi].” EX1006, ¶¶10. *Sewall* further discloses a first service policy that may specify

upload and download bandwidth limits for particular end users. *Id.*, ¶36. *Thomas* discloses that such bandwidth limits may vary based on, e.g., the type of second network. EX1005, ¶32 (explaining that Bluetooth has several disadvantages over Wi-Fi, including, e.g., “insufficient bandwidth for high speed data connections.”). Thus, a POSITA would have understood the *Sewall-Thomas* combination discloses a first service policy limiting bandwidth based on the second network. EX1003, ¶¶172-173; *supra* §VI.B.1.

Accordingly, claim 22 would have been obvious.

11. Claim 26: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify the one or more other end-user devices.”

Claim 26 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 26 obvious.

Thomas discloses its wireless device 110 can be programmed to accept computer traffic from a select number of client computing devices 114 (i.e., end-user devices). EX1005, ¶46. This may be performed using any number of methods, including “plug in keys; an identified parameter of the computing device such as MAC ID; a WEP key coded into the laptop to provide access to the particular wireless device 110; and software keys loaded on the client computing device 114.” EX1005, ¶46. Another method displays identifying information (e.g., SSID

or MAC address) of the client computing device 114 requesting forwarding services. EX1005, ¶46. In either case, *Thomas* discloses embodiments in which wireless device 110 identifies the end-user device(s) seeking forwarding services.

Thomas further discloses an exemplary user interface screen 1000 having a connection detail section indicating device names, MAC addresses, or other identifying information for connected client computing devices 114:

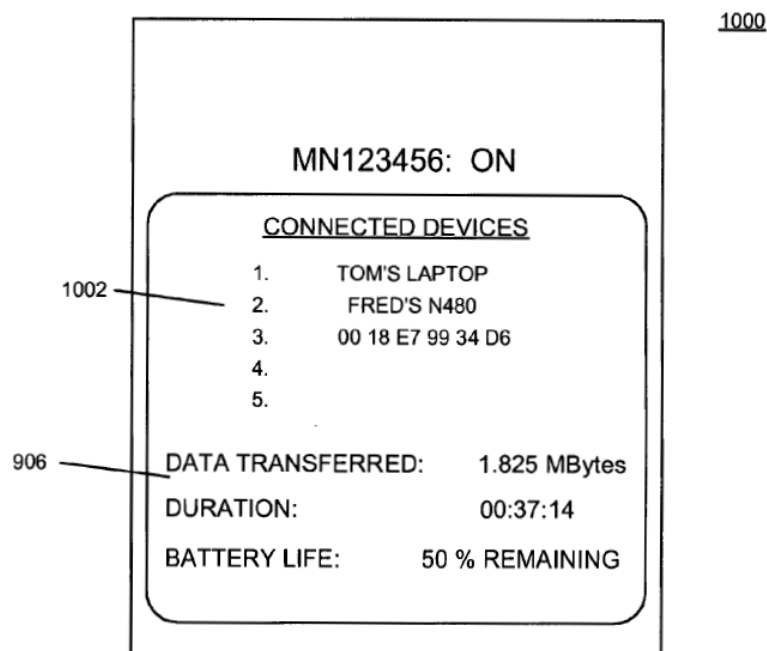


FIGURE 10

A POSITA would have been motivated to modify *Sewall*'s mobile hotspot with *Thomas*'s user interface providing identifying information on the mobile hotspot regarding connected devices so that certain users (e.g., the owner of the

mobile hotspot) could more conveniently monitor and control traffic from client devices. EX1003, ¶¶174-181.

Accordingly, claim 26 would have been obvious.

12. Claim 36: “wherein implement the first service policy comprises limit a number of the one or more other end-user devices allowed to use the forwarding service.”

Claim 36 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 36 obvious.

Sewall discloses device access rules that depend on the data subscription package the owner of the mobile hotspot has with service provider 22, including “limit[ing] the number of simultaneous users or sessions supported by [the mobile] hotspot.” EX1006, ¶34. Further, *Thomas* discloses “programming the wireless device 110 to accept computer traffic from a select number of client computing devices 114.” EX1005, ¶46. Combining these references’ disclosures was within a POSITA’s skillset, applying known techniques (e.g., basic programming) to obtain predictable results (e.g., limiting the number of simultaneous users). EX1003, ¶¶182-184; *KSR*, 550 U.S. at 420.

Accordingly, claim 36 would have been obvious.

13. Claim 52: “further comprising a user interface, and wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to cause a notification to be presented through the user interface.”

Claim 52 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 52 obvious.

Sewall discloses user interface data 44 that the mobile hotspot uses to present client devices with user interfaces such as web pages. EX1006, ¶23. These user interfaces provide controls for supplying identifying information such as a username and password, along with any payment information needed to access the mobile hotspot. *Id.* The user interfaces also provide controls for updating configuration data 42. *Id.*, ¶24.

Thomas also discloses providing the wireless device 110 itself with a user interface. *E.g.*, EX1005, ¶¶44, 76-77, Figs. 6-7. In certain embodiments, the user interface is configured for the user of the wireless device 110 to allow or disallow internet access to requesting client computing devices. EX1005, ¶44. For example, a request to use the wireless device 110 identifying the source of the request may appear on the display of the wireless device for the user of the wireless device to accept or deny. EX1005, ¶46. Alternatively, the user interface may present other notifications such as “a roaming notification, a startup or shutdown message display sequence, data limitations based upon service level agreement, and battery

status indications.” EX1005, ¶76. A POSITA would have understood such functions are performed by the processor. EX1003, ¶¶185-190.

As detailed above, a POSITA would have been motivated to modify *Sewall*’s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot so its owner could conveniently authorize and control traffic from client devices. *Supra* §VI.B.1; EX1003, ¶191.

Accordingly, claim 52 would have been obvious.

14. Claim 53: “wherein the notification is based on the monitored or identified successful use or attempted use of the forwarding service or of the one or more services.”

Claim 53 depends from claim 52, which is obvious. *Supra* §VI.B.14. *Sewall* and *Thomas* render claim 53 obvious for at least the reasons discussed regarding claim 52. *Supra* §VI.B.14.

Further, *Thomas* discloses embodiments in which the user interface provides a notification of successful use of the forwarding service. For example, Figure 9 illustrates an exemplary user interface screen that has an “active connections section” and may be configured to provide, e.g., a “roaming notification.” EX1005, ¶76, Fig. 9. Figure 10 illustrates an additional exemplary user interface screen providing additional connection information, including “device names, MAC addresses, or other identifying information.” EX1005, ¶77, Fig. 10. The user interface thus monitors and identifies successful use of the forwarding service. A

POSITA would have been motivated to implement this specific type of notification on *Sewall*'s mobile hotspot so the owner of the mobile hotspot could monitor usage of the forwarding service. *Supra* §VI.B.1; EX1003, ¶¶192-194.

Accordingly, claim 53 would have been obvious.

15. Claim 54: “wherein the notification comprises a warning.”

Claim 54 depends from claim 52, which is obvious. *Supra* §VI.B.14. *Sewall* and *Thomas* render claim 54 obvious.

Thomas discloses security features for the wireless device 110, such as “ensuring that only valid client computing devices 114 may connect to the wireless device 110; utilization of Wi-Fi security settings from the wireless device 110; access restrictions based upon MAC address; roaming awareness and management; and power management.” EX1005, ¶70. As such, *Thomas* discloses embodiments wherein the wireless device 110 has a user interface that presents warning notifications, such as “a roaming notification, a startup or shutdown message display sequence, data limitations based upon service level agreement, and battery status indications” (EX1005, ¶76), which are consistent with warnings described in the '451 patent. EX1003, ¶196; *see* EX1001, 3:9-14, Figs. 26G, 27A-P (disclosing exemplary “user service warning[s]”).

A POSITA would have been motivated to implement these specific types of warning notifications on *Sewall*'s mobile hotspot so its owner could be made

aware of circumstances impacting the forwarding service or associated costs.

Supra §VI.B.1; EX1003, ¶¶195-197.

Accordingly, claim 54 would have been obvious.

16. Claim 55: “wherein the notification comprises information about an offer or an option.”

Claim 55 depends from claim 52, which is obvious. *Supra* §VI.B.14. *Sewall* and *Thomas* render claim 55 obvious for at least the reasons discussed regarding claim 52. *Supra* §VI.B.14.

For example, *Thomas* discloses that the user of the wireless device 110 may accept or deny a request by a client computing device to access the internet through the wireless device. EX1005, ¶46. If accepted, the user of the client computing device is billed based on how long the client computing device accesses the network. EX1005, ¶¶23, 46. In this regard, the user of *Thomas*’s wireless device is notified of attempted use of the forwarding service and presented with an option to accept or deny an offer to be paid for allowing such use. EX1003, ¶199. A POSITA would have been motivated to implement such notifications on *Sewall*’s mobile hotspot so its owner could readily control access to the forwarding service. *Supra* §VI.B.1; EX1003, ¶¶198-200.

Accordingly, claim 55 would have been obvious.

17. Claim 56: “wherein the notification comprises an offer to enable or activate the forwarding service.”

Claim 56 depends from claim 52, which is obvious. *Supra* §VI.B.14. *Sewall* and *Thomas* render claim 56 obvious for at least the reasons discussed regarding claims 52 and 55. *Supra* §§VI.B.14, VI.B.16; EX1003, ¶¶201-202.

18. Claim 57: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to obtain a response to the notification.”

Claim 57 depends from claim 52, which is obvious. *Supra* §VI.B.14; EX1005, ¶46. *Sewall* and *Thomas* render claim 57 obvious for at least the reasons discussed regarding claim 52. *Supra* §VI.B.14; EX1003, ¶¶203-206.

19. Claim 58: “wherein the response to the notification comprises an acknowledgment.”

Claim 58 depends from claim 57, which is obvious. *Supra* §VI.B.19. *Sewall* and *Thomas* render claim 58 obvious for the reasons discussed regarding claim 57. For example, a POSITA would have understood that accepting or denying a request to access the internet comprises an acknowledgement of that notification. EX1003, ¶¶207-208.

20. Claim 59: “wherein the response to the notification comprises an indication of a response to an offer.”

Claim 59 depends from claim 57, which is obvious. *Supra* §VI.B.19. *Sewall* and *Thomas* render claim 59 obvious for the reasons discussed regarding claims 55 and 57. *Supra* §§VI.B.17, VI.B.19. For example, a POSITA would have

understood that accepting or denying a request to access (i.e., an offer to purchase) the internet comprises a response to the offer. EX1003, ¶¶209-210.

21. Claim 60: “wherein the response to the notification comprises an indication of a selection of an option.”

Claim 60 depends from claim 57, which is obvious. *Supra* §VI.B.19. *Sewall* and *Thomas* render claim 60 obvious.

As discussed above, *Thomas* discloses methods by which the wireless device 110 may authorize or deny traffic from client computing devices, including displaying a request from the computing device on the user interface that may be accepted or denied. EX1005, ¶46. The computing devices may only reach the network (e.g., internet) when authorized by the user of the wireless device. EX1005, ¶47. As such, a POSITA would have understood that the user of a client computing device requesting access to the internet receives an indication of the wireless device’s response based on whether it received access to the internet. EX1003, ¶¶211-213.

Accordingly, claim 60 would have been obvious.

22. Claim 61: “wherein the response to the notification comprises a directive to enable or activate the forwarding service.”

Claim 61 depends from claim 57, which is obvious. *Supra* §VI.B.19. *Sewall* and *Thomas* render claim 61 obvious for the reasons discussed regarding claims 57

and 59. *Supra* §§VI.B.19, VI.B.21. For example, a POSITA would have understood that accepting a request to access the internet reflects a directive to enable or activate the forwarding service. EX1003, ¶¶214-215.

23. Claim 62: “further comprising a user interface, and wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to obtain a user input through the user interface.”

Claim 62 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Thomas* render claim 62 obvious for the reasons discussed regarding claim 57. *Supra* §VI.B.19; EX1003, ¶¶216-217.

24. Claim 63: “wherein the user input comprises an acknowledgment.”

Claim 63 depends from claim 62, which is obvious. *Supra* §VI.B.24. *Sewall* and *Thomas* render claim 63 obvious for the reasons discussed regarding claim 62. For example, a POSITA would have understood that accepting or denying a request to access the internet comprises an acknowledgement of that notification. EX1003, ¶¶218-219.

25. Claim 64: “wherein the user input comprises an indication of an intention to activate or select a service offer or a service plan.”

Claim 64 depends from claim 62, which is obvious. *Supra* §VI.B.24. *Sewall* and *Thomas* render claim 64 obvious.

Thomas discloses methods for the user of its wireless device to authorize or deny traffic from client computing devices, including displaying a request from the computing device on the user interface to be accepted or denied. EX1005, ¶46. Further, *Sewall* and *Thomas* each disclose billing features through which client devices are charged for using the forwarding service. *Supra* §§VI.A.8, VI.B.1, VI.B.5, VI.B.16. A POSITA would thus have understood the user of the wireless device 110's response accepting a request to access the internet through the wireless device comprises "an indication of an intention to activate or select a service offer or a service plan." EX1003, ¶¶220-221.

Accordingly, claim 64 would have been obvious.

26. Claim 65: "wherein the user input comprises a directive to enable or activate the forwarding service."

Claim 65 depends from claim 62, which is obvious. *Supra* §VI.B.24. *Sewall* and *Thomas* render claim 65 obvious for the reasons discussed regarding claims 61 and 62. *Supra* §§ VI.B.22, VI.B.23. For example, a POSITA would have understood that accepting a request to access the internet reflects a directive to enable or activate the forwarding service. EX1003, ¶¶222-223.

27. Claim 69: “wherein the user input comprises an indication of a limit on a number of the one or more other end-user devices authorized to use the forwarding service.”

Claim 69 depends from claim 62, which is obvious. *Supra* §VI.B.24. *Sewall* and *Thomas* render claim 69 obvious.

Sewall and *Thomas* each disclose configuring the wireless device to accept traffic from a limited number of client devices. *Supra* §VI.B.12. For example, the user interface of *Thomas*’s wireless device receives user input authorizing traffic for a limited number of client computing devices. *See, e.g.*, EX1005, ¶46.

It would have been obvious to allow the wireless device user to “program[] the wireless device 110 to accept computer traffic from a select number of client computing devices 114” as an input provided through the user interface to increase its versatility. EX1003, ¶¶224-226. A POSITA would have been motivated to combine limits on the number of users authorized for the forwarding service as disclosed by the *Sewall-Thomas* combination with *Thomas*’s user interface to enable the wireless device user to control the limit on devices allowed to access the forwarding service. EX1003, ¶227.

Accordingly, claim 69 would have been obvious.

C. Ground 3: Claims 20 and 23 Are Obvious over *Sewall* and *Polson*

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

Like *Sewall*, *Polson* is analogous art to the '451 patent. It shares the same field of endeavor: mobile devices and wireless access points for computer networking. EX1015, Abstract, ¶¶2, 16, 20-23, 26, 56, Figs. 1-2, 9-15. It also shares a common goal with the '451 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including improving the customizability and monetization of mobile-hotspot technology. *Id.*; *see also id.*, ¶¶29-35, 38-39, 44-46, 52-53, 78-79.

A POSITA would have been motivated to combine *Polson*'s strategies for managing WWAN access with *Sewall*'s access rules to effectively manage conflicts among end-user devices sharing the WWAN network. EX1003, ¶¶228-229. Indeed, *Sewall*'s access rules for the owner, authorized user, and anonymous user profiles vary, and often prioritize the owner's access over an authorized or anonymous user. EX1006, ¶36. *Polson* similarly explains its gateway is adapted to prioritize specific data—like the owner's access—to manage conflicts between LAN devices sharing limited WWAN capacity. EX1015, ¶46.

Additionally, a POSITA would have been motivated to combine *Polson*'s strategies for managing WWAN access to enable *Sewall*'s mobile hotspot to move

from one WWAN to another without losing internet access. EX1003, ¶230. Indeed, *Polson* recognizes the ability to connect to multiple WWANs is necessary when one WWAN is not available due to the location of the user, issues with the service provider, or the features of a service agreement. EX1015, ¶¶52-53.

Combining these references' disclosures was within a POSITA's skill, applying known techniques (e.g., basic programming and multiple WWAN interfaces) to obtain predictable results (e.g., prioritizing user access and continued access across different WWANs). EX1003, ¶231; *KSR*, 550 U.S. at 420.

2. Claim 20: “wherein the first service policy or the second service policy is based on a network capacity or congestion.”

Claim 20 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Polson* render claim 20 obvious.

Sewall discloses implementing access rules to assist with controlling traffic. *E.g.*, EX1006, ¶26. These access rules may, *inter alia*, limit a user's duration of use, available bandwidth, or limit the amount of data the user can download in a given period. *Id.* *Polson* discloses adapting its gateway to prioritize specific data over the WWAN to manage conflicts between devices sharing limited WWAN capacity. EX1015, ¶46. As detailed above, a POSITA would have been motivated to extend *Sewall*'s access rules to address limited WWAN (first network) capacity

as *Polson* discloses to effectively manage conflicts among devices resulting from sharing such limited capacity. *Supra* §VI.C.1; EX1003, ¶¶232-234.

Accordingly, claim 20 would have been obvious.

3. Claim 23: “wherein the first service policy or the second service policy is based on an aspect of a hardware element that provides the first network or the second network.”

Claim 23 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Polson* render claim 23 obvious.

Sewall discloses second access rules to assist with controlling second traffic between the mobile hotspot and the internet via remote link 24. EX1006, ¶34. The second access rules for the mobile hotspot may, *inter alia*, specify upload and download bandwidth limits, limit the amount of data transfer allowed in a given period, or limit the number of simultaneous users or sessions supported. *Id.*

Polson discloses its gateway comprises a socket adapted to removably receive one or more WWAN interfaces 110 to send and receive data through one or more WWANs and the gateway may determine whether the WWAN interface 110 is associated with a service agreement. EX1015, ¶¶20, 40. *Polson* teaches the WWAN interfaces 110 may come in the form of a PC Card or Modem capable of plugging into the gateway’s socket. *Id.*, ¶51.

As detailed above, a POSITA would have been motivated to modify *Sewall*’s access rules to account for a hardware element—such as the PC Card or

Modem taught in *Polson*—to prevent the mobile hotspot (and client devices) from losing internet access when the mobile hotspot moves from one WWAN to another. *Supra* §VI.C.1; EX1003, ¶¶235-240.

Accordingly, claim 23 would have been obvious.

D. Ground 4: Claims 33, 43, and 44 Are Obvious over *Sewall* and *Krishnaswamy*

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

Like *Sewall*, *Krishnaswamy* is analogous art to the '451 patent. It shares the same field of endeavor: mobile devices and wireless access points for computer networking. EX1020, Abstract, 3:51-4:21, Figs. 1-2. It also shares a common goal with the '451 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including improving the customizability and monetization of mobile-hotspot technology. EX1020, Abstract, 3:51-4:21, 6:1-16, 7:61-8:15, 9:54-63, 11:26-44, Figs. 1-2.

A POSITA would have been motivated to implement a combination of *Sewall*'s and *Krishnaswamy*'s access-limiting and access-enabling features. EX1003, ¶¶241-242. A POSITA would have been further motivated to ensure all user data collected by *Sewall*'s mobile hotspot was sent to the network system, as taught by *Krishnaswamy*, to monitor and optimize network resource utilization. EX1003, ¶243. This would ensure resources, e.g., to the first network, are

appropriately (i) apportioned based on the actual and/or expected needs of the client devices and (ii) priced and paid for based on the actual usage by the client devices. *Id.* Combining these references' disclosures was within a POSITA's skill by January 2009, applying known techniques (e.g., basic programming to send user data to the network) to obtain predictable results (e.g., ensuring appropriate provisioning or payment for network resources). EX1003, ¶244; *KSR*, 550 U.S. at 420.

2. Claim 33

Claim 33 depends from claim 1, which is obvious. *Supra* §VI.A.1. Its additional features also would have been obvious as detailed below.

a. 33[a]: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: determine, based on the monitored or identified successful use or attempted use of the forwarding service, that the usage of the forwarding service has reached the limit or allowance, and”

Sewall and *Krishnaswamy* render 33[a] obvious. EX1003, ¶¶246-248.

Sewall discloses implementing access rules to assist with controlling traffic. *E.g.*, EX1006, ¶26. These access rules may, *inter alia*, limit a user's duration of use, available bandwidth, or the amount of data the user can download in a given period. *Id.*, ¶¶26, 36. *Sewall* explains that access engine 48 is responsible for

blocking communications to and from a user once that user has reached the prescribed limits. *Id.*, ¶26

Krishnaswamy similarly discloses its ad hoc service provider 106 is configured to alter its ability to provide service for a wireless network in response to a resource-related event, such as an indication that an available bandwidth is below a bandwidth threshold. EX1020, 10:51-54, 11:3-24.

b. 33[b]: “based on the determination that the usage of the forwarding service has reached the limit or allowance, modify the first service policy to throttle or restrict the first traffic.”

Sewall and *Krishnaswamy* render 33[b] obvious. *Krishnaswamy* teaches that in response to detecting a resource-related event, the ad hoc service provider 106 may alter one or more attributes of the ad hoc service provider’s service such as a data rate of the service or the duration of the service, i.e., “throttling” or “restricting” the service. EX1020, 11:26-44.

As detailed above, a POSITA would have been motivated to modify *Sewall*’s first access rules, particularly those associated with anonymous user profiles, to reduce the data rate or otherwise restrict first traffic as taught in *Krishnaswamy* to prevent client devices, particularly those associated with particular profiles (e.g., owner or authorized user profiles), from losing internet

access when usage of the forwarding service reaches a previously set limit or allowance. *Supra* §VI.D.1; EX1003, ¶¶249-250.

Accordingly, claim 33 as a whole would have been obvious.

3. Claim 43: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to cause information to be sent to the network system, the information comprising a measure of usage of the forwarding service.”

Claim 43 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Krishnaswamy* render claim 43 obvious.

Sewall discloses its mobile hotspot tracks user data 58, including usage data reflecting the amount of data uploaded or downloaded in a particular time frame. EX1006, ¶38, Fig. 5.

Krishnaswamy discloses its ad hoc service provider 106 includes a service provider application 208 that maintains a session with the server 110 over the network 102 to exchange messages. EX1020, 6:62-64, Figs. 1-2. The service provider application 208 controls the interconnection and session monitoring module 206, which monitors the amount of content to/from the mobile clients 108 as well as WWAN and WLAN network resource utilization. *Id.*, 7:1-12, Figs. 1-2.

As detailed above, a POSITA would have been motivated to ensure *Sewall*’s user data 58 was sent to the network system, as taught by *Krishnaswamy*, to ensure resources, e.g., to the first network, are appropriately provisioned based on the

expected needs of the client devices and are appropriately paid for based on the actual usage by the client devices. *Supra* §VI.D.1; EX1003, ¶¶251-255.

Accordingly, claim 43 as a whole would have been obvious.

4. Claim 44: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to cause information to be sent to the network system, the information being associated with usage of the forwarding service.”

Claim 44 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall* and *Krishnaswamy* render claim 44 obvious for the reasons discussed regarding claim 43. *Supra* §VI.D.3; EX1003, ¶¶256-257.

E. Ground 5: Claims 25 and 28 Are Obvious over *Sewall*, *Krishnaswamy*, and *Pandya*

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

Like *Sewall* and *Krishnaswamy*, *Pandya* is analogous art to the ’451 patent. It shares the same field of endeavor: mobile devices and wireless access points for computer networking. EX1009, Abstract, ¶¶28-31, Figs. 2, 4. It also shares a common goal with the ’451 patent: bridging or routing traffic from other devices to a network system (e.g., the internet), including managing network resources. EX1009, Abstract, ¶¶28-31, 46-54, Figs. 2, 4.

A POSITA would have been motivated to extend *Sewall*’s access rules to authorize not only specific network destinations but also specific services and

applications in view of the disclosures of *Krishnaswamy* and *Pandya*. EX1003, ¶¶258-260. A POSITA would have understood based on at least *Krishnaswamy* and *Pandya* that certain services and applications use more network resources and/or are more critical than others. EX1003, ¶¶258-266; EX1009, ¶47. As such, a POSITA would have extended *Sewall*'s access rules to manage network resources and ensure more critical services and applications are prioritized by authorizing network access to more critical services and applications over those less critical. EX1003, ¶260.

Combining these references' disclosures was within a POSITA's skill and would apply known techniques (e.g., basic programming to restrict network resources to certain services or applications) to obtain predictable results (e.g., improved network access for more critical services or applications). *KSR*, 550 U.S. at 420.

2. Claim 25: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify one or more applications for which the first end-user device is authorized to provide the forwarding service.”

Claim 25 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall*, *Krishnaswamy*, and *Pandya* render claim 25 obvious.

Sewall discloses access rules permitting the mobile hotspot to direct an anonymous user only to a payment service on the internet. EX1006, ¶28, Fig. 4;

supra §VI.A.8. *Krishnaswamy* discloses a Secure Sockets Layer Virtual Private Network tunnel between a mobile client and the server that, once established, supports specific services such as audio or video services to the mobile client. EX1020, 5:52-63. *Pandya* discloses its client-computing device 22 includes an associated agent 70 that monitors the activity of device 22 and communicates with control point 72. EX1009, ¶45; *see also id.*, ¶¶37-38. Control point 72 accesses system policies and provides policy data to agent 70 to, e.g., block or restrict non-business critical applications when performance of business-critical applications is degraded beyond a threshold point. *Id.*, ¶¶46-48; *see also id.*, ¶79.

As detailed above, a POSITA would have been motivated to extend *Sewall*'s access rules to authorize not only specific network destinations but also specific services and applications in view of the disclosures of *Krishnaswamy* and *Pandya*. EX1003, ¶¶261-266. A POSITA would understand that certain services and applications use more network resources or are more critical than others and would have implemented access rules to manage network resources and ensure more critical services and applications are prioritized. *Id.*; *supra* §VI.E.1.

Accordingly, claim 25 would have been obvious.

3. Claim 28: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify a traffic type, an application type, a service type, or a content type for which the first end-user device is authorized to provide the forwarding service.”

Claim 28 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall*, *Krishnaswamy*, and *Pandya* render claim 28 obvious for the reasons discussed regarding claim 25. *Supra* §VI.E.2. For example, a POSITA would have been motivated to extend *Sewall*’s access rules to authorize not only specific network destinations but also specific types of traffic, applications, services, and content in view of the disclosures of *Krishnaswamy* and *Pandya* regarding more critical types of traffic, applications, services, and content. EX1003, ¶¶267-268; EX1009, ¶¶ 42-48, 79; EX1020, 5:52-63; EX1006, ¶¶ 7, 28, 51, 58.

F. Ground 6: Claims 50 and 67 Are Obvious over *Sewall*, *Thomas*, and *Pandya*

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

Sewall, *Thomas*, and *Pandya* are analogous art to the ’451 patent. They are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* §§VI.B.1, VI.E.1. They also share a common goal with the ’451 patent: bridging or routing traffic from other devices to a network system (e.g., the internet), including managing network resources (e.g., usage

control, and user interactivity and notifications via graphical user interfaces).

Supra §§VI.B.1, VI.E.1.

As detailed above, a POSITA would have been motivated to modify *Sewall*'s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot and incorporate *Thomas*'s roaming features. *See* §§VI.B.7, VI.B.22, VI.F.1 Further, a POSITA would have been motivated to modify the combination—including *Sewall*'s first access rules—in view of *Pandya* to specify optimum network resources for particular tasks and account for limitations of specific network types (e.g., roaming) to ensure efficient allocation of network resources. EX1003, ¶¶269-277. For example, *Pandya* discloses that continuous media applications have certain bandwidth requirements and are particularly sensitive to network jitter and delay. EX1009, ¶50; *see also* EX1005, ¶54 (noting elevated quality of service requirements for latency sensitive applications). A POSITA would have endeavored to avoid these issues as taught by *Pandya*. EX1003, ¶¶269-271, 278-281.

Combining these references' disclosures was within a POSITA's skillset, applying known techniques (e.g., basic programming to determine task requirements and network resources) to obtain predictable results (e.g., managing the allocation of network resources and allowing users to decide whether to

proceed with suboptimal resources). EX1003, ¶¶271, 280-281; *KSR*, 550 U.S. at 420.

2. Claim 50: “wherein an aspect of the second service policy differs from the aspect of the first service policy when the first network comprises a roaming network.”

Claim 50 depends from claim 1, which is obvious. *Supra* §VI.A.1. *Sewall*, *Thomas*, and *Pandya* render claim 50 obvious. EX1003, ¶¶272-277.

Sewall discloses first access rules for the user profiles to assist with controlling first traffic between client devices and the internet. EX1006, ¶36; *supra* §VI.A.1.e. *Sewall* also discloses second access rules for the device profile to assist with controlling second traffic between the mobile hotspot and the internet. EX1006, ¶34; *supra* §VI.A.1.f. *Sewall* further discloses differences between the first and second access rules. *See* EX1006, ¶23. For example, *Sewall* discloses that the access rules that apply to downstream client devices used by authorized or anonymous users are typically “more limiting” than the access rules for the mobile hotspot itself (and its owner). EX1006, ¶36. To the extent Patent Owner argues that *Sewall* does not explicitly describe differences between the first and second access rules that apply when the first network is a roaming network, it would have been obvious to modify *Sewall*’s access rules to incorporate such differences in view of *Thomas* and *Pandya*.

As an initial matter, *Thomas* discloses security features for its wireless device 110 to promote roaming awareness and management, including data plans with roaming included in the plan coverage. EX1005, ¶¶70-71. As discussed above, a POSITA would have been motivated to modify *Sewall*'s second access rules to accommodate a roaming network in view of *Thomas*'s disclosure of roaming awareness, management, and data plans so that *Sewall*'s mobile hotspot (and certain client devices) can maintain access to the internet when roaming.

Supra §VI.B.1.

A POSITA would have also understood, including from *Thomas*, that data transfers over a roaming network typically are slower and/or involve higher costs. EX1003, ¶275. In this regard, *Pandya* discloses modifying access rules by “adjusting service levels and/or bandwidth allocations for networking devices” or potentially “blocking network access” based on, *inter alia*, available bandwidth on the network. EX1009, ¶¶51-52; *see id.*, ¶83. Recognizing that *Sewall*'s access rules implement more stringent networking limits for users other than the owner of its mobile hotspot, and in light of the constraints on the first network when roaming and *Thomas*'s disclosure of roaming awareness and management, a POSITA would have been motivated to modify *Sewall*'s first access rules to reallocate available bandwidth (as disclosed in *Pandya*) when the mobile hotspot is roaming. EX1003, ¶¶272-277. For example, a POSITA would have been motivated to vary the first

and second access rules so that, when the mobile hotspot is roaming, the networking limits for users other than the owner are lowered to ensure that the mobile hotspot itself is afforded the same upload/download bandwidth limits and data transfer limits so its owner maintains uninterrupted and reliable internet access. *Id.* It would thus have been obvious to a POSITA, based on the combination of *Sewall*, *Thomas*, and *Pandya*, to modify *Sewall*'s mobile hotspot so that an aspect of its second service policy differs from the aspect of its first service policy when the first network comprises a roaming network.

Accordingly, claim 50 would have been obvious.

3. Claim 67: “wherein the user input comprises a directive to change at least an aspect of the first service policy independently of the second service policy.”

Claim 67 depends from claim 62, which depends from claim 1. Claims 1 and 62 are obvious. *Supra* §§VI.A.1, VI.B.22. *Sewall*, *Thomas*, and *Pandya* render claim 67 obvious. EX1003, ¶¶278-281.

Sewall discloses controlling first traffic between the client devices and the internet with first access rules that specify, e.g., upload and download bandwidth limits or limits on the amount of data transfer allowed in a given period. EX1006, ¶36. *Pandya* discloses methods for allocating network resources by defining the optimum levels for particular tasks and implementing policies to ensure the desired level of resources is provided to accomplish a task. EX1009, ¶¶49-50. If the

optimum resources are not available, the policies provide the user with the option to proceed with the requested task with suboptimal resources or wait until later to perform the task. *Id.*

A POSITA would have been motivated to modify *Sewall*'s mobile hotspot to incorporate *Pandya*'s network-management features through a user interface on the mobile hotspot, as disclosed in *Thomas*, to allow the hotspot owner to more readily modify the first access rules—independently of the second access rules—through user input prioritizing requested tasks and specifying the preferred course of action when suboptimal resources are available. EX1003, ¶280. For example, the owner of the mobile hotspot may be willing to proceed with suboptimal resources but reluctant to jeopardize their reputation by allowing other users to proceed with suboptimal resources. *Id.*; *see, e.g.*, EX1020, 6:9-16 (describing the use of quality metrics to assist mobile clients with choosing among ad hoc service providers). It would thus have been obvious, based on the combination of *Sewall*, *Thomas*, and *Pandya*, to modify *Sewall*'s mobile hotspot to receive user input directing a modification of the first service policy independent of the second service policy.

Accordingly, claim 67 would have been obvious.

G. Ground 7: Claims 66 and 68 Are Obvious over *Sewall, Thomas, and Polson*

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

Sewall, Thomas, and Polson are analogous art to the '451 patent. They share the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* §§VI.B.1, VI.C.1. They also share a common goal with the '451 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including improving customizability and monetization of mobile-hotspot technology. *Supra* §§VI.B.1, VI.C.1.

As detailed above, a POSITA would have been motivated to modify *Sewall*'s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot. *See* §§VI.B.22, VI.F.1; EX1003, ¶288 A POSITA would have been motivated to further modify the user interface to provide the user with options to modify their service agreement as set forth in *Polson*. *Id.* Specifically, *Polson* discloses the subscriber determination logic of the gateway may allow a subscriber to *change* their service agreement to one that allows for WWAN access via the gateway, or to purchase WWAN access on another basis. EX1015, ¶31. A POSITA would have implemented *Polson*'s teachings on *Sewall*'s mobile hotspot so its owner could obtain access for additional client devices or additional data beyond that provided in the service agreement. EX1003, ¶¶282-284, 288.

Combining these references' disclosures was within a POSITA's skill, applying known techniques (e.g., basic programming to enable adjusting a service agreement) to obtain predictable results (e.g., access for additional client devices or additional data beyond the service agreement). EX1003, ¶284; *KSR*, 550 U.S. at 420.

2. Claim 66: “wherein the user input comprises a directive to change at least an aspect of the first service policy or the second service policy.”

Claim 66 depends from claim 62, which depends from claim 1. Claims 1 and 62 are obvious. *Supra* §§VI.A.1, VI.B.22. *Sewall*, *Thomas*, and *Polson* render claim 66 obvious. EX1003, ¶¶285-288.

Sewall and *Thomas* disclose changing the first service policy through user input. *Sewall* discloses a user interface presented to a client device with controls for updating configuration data, including access rules for the personal hotspot. EX1006, ¶¶ 23-24; *supra* §VI.B.22. *Thomas* discloses a display 314 on its wireless device 110 through which the user of the wireless device may accept or deny requests to access the internet through the wireless device. EX1005, ¶46; *supra* §VI.B.22.

Polson discloses changing the second service policy through user input. In certain embodiments, the subscriber determination logic of gateway 108 may facilitate a subscriber in altering their existing WWAN 112 access. EX1015, ¶31.

Specifically, the subscriber can change their service agreement to one that allows for WWAN, or to purchase WWAN 112 access on another basis, e.g., a certain period of time, a certain quantity of bytes downloaded, etc. *Id.*

As detailed above, a POSITA would have been motivated to modify *Sewall*'s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot so the owner of the mobile hotspot could more conveniently authorize and control traffic from client devices. *Supra* §§VI.B.24, VI.G.1; EX1003, ¶288. A POSITA would have been motivated to further modify the user interface to provide the user with options to modify their service agreement, as set forth in *Polson*, to support additional client devices or data transfer. EX1003, ¶288.

Accordingly, claim 66 would have been obvious.

3. Claim 68: “wherein the user input comprises a directive to change at least an aspect of the second service policy independently of the first service policy.”

Claim 68 depends from claim 62, which depends from claim 1. Claims 1 and 62 are obvious. *Supra* §§VI.A.1, VI.B.22. *Sewall*, *Thomas*, and *Polson* render claim 68 obvious for the reasons discussed regarding claim 66. *Supra* §VI.G.2; EX1003, ¶¶289-290.

VII. Mandatory Notices

A. Real Parties-in-Interest

Google LLC¹ is a real party-in-interest.

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

As identified in the related matters below, the ’451 patent is being asserted against multiple Carriers in 2:25-cv-00914, 2:25-cv-00919, and 2:25-cv-00921. On December 1, 2025, the Carriers in those cases filed a joint opposed motion to stay the litigations under, among other things, the customer-suit exception. *See* Defendants’ Joint Opposed Motion to Stay, *Headwater Res. LLC v. DISH Network Corp.*, 2:25-cv-00921 (Dec. 1, 2025), ECF No. 52. On December 8, 2025, a redacted version of that motion was made publicly available. *See id.* ECF No. 63. On December 19, 2025, Headwater filed a sealed response to the motion. *See id.*

¹ Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc.

ECF No. 73. On January 9, 2026, the Carriers filed a sealed reply. *See id.* ECF No. 82. In light of these filings, Google names the following Carriers (the named defendants in these cases) as real parties-in-interest to this proceeding:

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

Charter Communications, Inc., Charter Communications, LLC, Charter Communications Operating, LLC, Spectrum Gulf Coast, LLC, Spectrum Management Holding Company, LLC and Headwater Research LLC filed a Joint

Motion to Stay All Deadlines and Notice of Settlement on August 5, 2026. *See id.* ECF No. 110.

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

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

B. Related Matters

The '451 patent is or has been involved in the following proceedings:

Name	Number	Forum	Filed
<i>Google LLC v. Headwater Research LLC</i>	IPR2026-00467	PTAB	Aug. 28, 2026
<i>Headwater Research LLC v. Comcast Cable Communications, LLC d/b/a Xfinity et al</i>	2:25-cv-00914	E.D. Tex.	Aug. 29, 2025
<i>Headwater Research LLC v. Charter Communications, Inc. et al</i>	2:25-cv-00919	E.D. Tex.	Aug. 29, 2025
<i>Headwater Research LLC v. DISH Network Corporation et al</i>	2:25-cv-00921	E.D. Tex.	Aug. 29, 2025

<i>Headwater Research LLC v. Apple Inc.</i>	7:25-cv-00375	W.D. Tex.	Aug. 27, 2025
<i>Headwater Research LLC v. Google LLC</i>	7:25-cv-00376	W.D. Tex.	Aug. 27, 2025
<i>Headwater Research LLC v. AT&T Inc. et al</i>	2:25-cv-00428	E.D. Tex.	Apr. 23, 2025
<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

C. Lead and Back-Up Counsel

Lead Counsel	Back-Up Counsel
Erika H. Arner, Reg. No. 57,540 erika.arner@finnegan.com Finnegan, Henderson, Farabow, Garrett, & Dunner LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2754 Fax: 202-408-4400	Joshua L. Goldberg, Reg. No. 59,369 joshua.goldberg@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW Washington, DC 20001-4413 Phone: 202-408-6092 Fax: 202-408-4400 Daniel C. Tucker, Reg. No. 62,781 daniel.tucker@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer St, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2793 Fax: 202-408-4400 Benjamin A. Saidman, Reg. No. 69,325 benjamin.saidman@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 271 17th Street NW, Suite 1400 Atlanta, GA 30363-6209 Phone: 404-653-6510 Fax: 404-653-6444 Daniel F. Klodowski, Reg. No. 72,693 daniel.klodowski@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW Washington, DC 20001-4413 Phone: 202-408-4216 Fax: 202-408-4400

Lead Counsel	Back-Up Counsel
	Elliot Cook, Reg No. 61,769 elliott.cook@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer St, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2738 Fax: 202-408-4400 Michael V. Young (Reg. No. 61,180) michael.young@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Phone: 571-203-2788 Fax: 202-408-4400 Alexander M. Boyer, Reg. No. 66,599 alexander.boyer@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Phone: 571-203-2759 Fax: 202-408-4400 Pier D. DeRoo, Reg. No. 69,340 pier.deroo@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW Washington, DC 20001-4413 Phone: 202-408-4418 Fax: 202-408-4400 Christopher C. Johns, Reg. No. 68,664 Christopher.Johns@finnegan.com

Lead Counsel	Back-Up Counsel
	Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW, Washington, DC 20001-4413 Tel: 202-408-4155 Fax: 202-408-4400 Kassandra M. Officer, Reg. No. 74,083 Kassandra.Officer@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW, Washington, DC 20001-4413 Tel: 202-408-4270 Fax: 202-408-4400 Bradford C. Schulz, Reg. No. 75,006 bradford.schulz@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2739 Fax: 202-408-4400 William C. Neer, Reg. No. 78,874 william.neer@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW Washington, DC 20001-4413 Phone: 202-408-4054 Fax: 202-408-4400 Christopher B. Anderson, Reg. No. 77,898 christopher.anderson@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP

Lead Counsel	Back-Up Counsel
	1875 Explorer St, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2765 Fax: 202-408-4400 Kai Rajan, Reg. No. 70,110 kai.rajan@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW Washington, DC 20001-4413 Phone: 202-408-4363 Fax: 202-408-4400 Umber Aggarwal, Reg. No. 76,098 umber.aggarwal@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2423 Fax: 202-408-4400 Abhay A. Watwe, Reg. No. 59,461 abhay.watwe@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2716 Fax: 202-408-4400 Kathleen C. Galleher, Reg. No. 80,837 kathleen.galleher@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023

Lead Counsel	Back-Up Counsel
	Tel: 571-203-2448 Fax: 202-408-4400 Connor M. McGregor, Reg. No. 79,634 connor.mcgregor@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW Washington, DC 20001-4413 Phone: 202-408-4363 Fax: 202-408-4400 Heather J. Ren, Reg. No. 82,089 heather.ren@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue NW Washington, DC 20001-4413 Phone: 202-408-4024 Fax: 202-408-4400 Yi Yang, <i>pro hac vice</i> to be filed yi.yang@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 2 Seaport Lane, 6 th Floor Boston, MA 02210 Phone: 617-646-1642 Fax: 202-408-4400

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 '451 patent is available for IPR and that
Petitioner is not barred or estopped from requesting IPR.

IX. Conclusion

Petitioner requests IPR and cancellation of claims 1-9, 11-16, 24, 20, 22-23,
25-28, 33, 36, 43-44, 50, and 52-69. The Office may charge any required fees to
Deposit Account No. 06-0916.

Date: August 28, 2026

Respectfully submitted,

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

CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, Petitioner certifies that the word count of Petitioner's Petition for *Inter Partes* Review (exclusive of any table of contents, table of authorities, mandatory notices under § 42.8, certificates of service and word count, and list of exhibits or claim listing) as measured by Microsoft Word is 13,969.

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 August 28, 2026, a copy of the foregoing Petition for *Inter Partes* Review, the associated power of attorney, and Exhibits 1001-1006, 1009-1010, 1012-1015, 1020-1021, 1025 were served by FedEx Priority Overnight on the correspondence address of record indicated in the Patent Office's Patent Center website for U.S. Patent No. 8,799,451:

James Harris
Headwater Research LLC - Outside Firm 1
110 North College Avenue
Suite 1116
Tyler, TX 75702
UNITED STATES

Date: August 28, 2026

By: /Lisa C. Hines/
Lisa C. Hines
Case Manager
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP